QST

DEVOTED ENTIRELY TO

AMATEUR RADIO

PUBLISHED SINCE 1915 BY THE AMERICAN RADIO RELAY LEAGUE INC.

'Round the world with a radio yacht

SEE PAGE 12

JUNE 1929

25c

QST

The Official Organ of the A·R·R·L

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The American Radio Relay League

The American Radio Relay League, Inc., is a non-commercial association of radio amateurs, bonded for the promotion of interest in amateur radio communication and experimentation, for the relaying of messages by radio, for the advancement of the radio art and of the public welfare, for the representation of the radio amateur in legislative matters, and for the maintenance of fraternalism and a high standard of conduct.

It is an incorporated association without capital stock, chartered under the laws of Connecticut. Its affairs are governed by a Board of Directors, elected every two years by the general membership. The officers are elected or appointed by the Directors. The League is non-commercial and no one commercially engaged in the manufacture, sale or rental of radio apparatus is eligible to membership on its board.

"Of, by and for the amateur," it numbers within its ranks practically every worth-while amateur in the world and has a history of glorious achievement as the standard-bearer in amateur affairs.

Inquiries regarding membership are solicited. A bona fide interest in amateur radio is the only essential qualification; ownership of a transmitting station and knowledge of the code are not prerequisite. Correspondence should be addressed to the Secretary.

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EDITORIALS

IN the "net" system of communication used by the Army and Navy and particularly exemplified by the Army-Amateur nets now in process of organization all over the country, there is an idea which, it seems to us, is worth investigating with a view to giving it a wider application in amateur radio generally. We refer to the basic fact that all the stations in any one such net use the same frequency. Thus the ultimate economy in frequency channels is realized.

Consider for a moment the fact that only by accident do two amateur stations, corresponding with each other, use the same frequency. Since one transmits while the other listens, it is apparent that twice as many channels are being used as are necessary, and from the standpoint of any third party there are twice as many interference possibilities to his own work. In other words, and to come immediately to the point, interference would be halved and the practical width of any amateur band doubled if the pairs of stations in communication with each other would use the same frequency.

Having launched this breath-taking idea, let us examine its possibilities a bit more closely, its potentialities both *pro* and *con*. Any such scheme would be most useful in our most crowded band, 7000–7300 kc. Our self-excited "High-C" transmitters of to-day are capable of changing frequency to any place in this band without difficulty, and by means of monitors we can quickly adjust them to any desired point, particularly with reference to some other station in the band. Here are the tools; now for the application. Suppose *A* calls *B* with the understanding that *B* shall answer on the same frequency. Then *A* knows just where to listen for *B* in the hubbub. More than that, *A* for the first time in history has control of the frequency used by his correspondent — something we have all yearned for — and he can deliberately choose a spot in the spectrum which, on his receiving tuner, is reasonably free of interference. That too is as it should be: *B's* transmission ought to be on a frequency convenient to *A's* reception. Now consider a chap CQ-ing. Suppose by some signal he indicates his intent to listen for replies near his own frequency. The stations answering him quickly shift their transmitters to about that wave. The CQ-er knows where to listen; he knows that, although the interference may be severe during the answering, it is going to be less afterwards; the answerers know that they are not going to be left out in the cold because the CQ-er "started at the wrong end of the band" when he commenced listening and "never got to" them; and the interruption to other amateur traffic is much less than happens now when fifty stations on fifty frequencies fill that elastic medium, the ether, with hopeful replies to a CQ. Again, imagine that we had an understanding in amateur radio that when a station signed off, it would stand by for new calls on its own frequency. How much greater the chance of QSO than now! Even in traffic work in the less-crowded 3500–4000 band the idea has application. Any group of message-handlers who work closely together may profitably ring some changes on the "five-point system" by some plan wherein they use a single frequency and transmit one at a time in turn, each fellow taking his own traffic, and so on.

So far we've talked *pros*. The *con* side, we admit, is full of dynamite. First off, we have lost the benefit of knowing the fixed frequencies of the stations we are interested in so that we can tell whether they are there or not. This, it seems to us, is offset by the potential gains of the plan, and a chap can always announce his return, after finishing a QSV-contact, to a normal frequency he has selected for himself and so again be "at home" to his friends. A far more vital objection to the scheme is the probability that increased interference would result from the frequent adjustments of frequency. Static in television would be nothing compared with the streaks of interference which could wipe across our bands as a hundred stations, preparing to answer a CQ, held down their keys and turned their knobs while they shifted frequency. This plan is only for those who know that they know how to use their heads. Both station equipment and operator's skill must be such that a shift to a monitored frequency can be made in, say, two seconds, and then only after the calling station has stopped. That way it would work.

Whether this idea is meritorious but too Utopian for 1929, hopeless because we amateurs are but human, dangerous because it hinders instead of aids, or actually capable of helping our communication — is to be determined only by trying it. It may be tried and found a flop, and *QST* in a few months may be yelling bloody murder against this very scheme, but it seems to-day very worth while trying. We urge those of you who can to give it a whirl — you and your buddy, you on your seven-o'clock sked with Bill Whatshisname, you on your contacts with your cousin on that Abyssinian expedition — and that you let A.R.R.L. Headquarters know whether you find it good, bad, or merely so-so. K. B. W.

WHDC

Aboard the *Nomad* on a World Cruise

By Stephens Miranda*

A FIFTY-FOOT boat does not offer the best of opportunities for the installation of radio receiving and transmitting equipment but when a trip around the world is planned, one does not care to set out without this most necessary item. This matter, therefore, received a good deal of attention when Daniel Blum and the writer determined to make such a voyage in the *Nomad*, a fifty-foot ketch-rigged double-ended sailing yacht. While normally proceeding under sail, the boat has a cruising radius of approximately 1500 miles under its own power generated by a two-cylinder fourcycle Frisco-Standard gas engine.

Space is only too scarce, particularly on a boat having a beam of but 13 feet, 6 inches, when such a long voyage is planned and in addition to the usual ship's stores and supplies, motion picture cameras, film, literary equipment and other special expeditionary gear must be stowed away.

However, a careful survey of the boat disclosed a cabinet four feet by three feet by twenty inches as being most suitable for the radio "shack" and the decision to use it put a strict, unalterable limitation upon the dimensions of the equipment that could be installed.

Photos courtesy Nomad Expedition

THE "NOMAD" JUST BEFORE THE START OF THE WORLD CRUISE

At the stern may be seen Daniel Blum and Stephens Miranda, the organizers of the expedition.

While a high-frequency transmitter and receiver would be capable of taking care of all messages to be sent home to the States regardless of the position of the *Nomad*, it would be of little worth for ship-to-shore work and obtaining radio compass bearings and weather reports or in handling distress calls. Because of this, it was decided to carry not only the high-frequency equipment but also a medium-frequency transmitter and receiver capable of operating on the commercial frequencies of 500 and 469 kc. (600 and 640 meters). The two sets are complimentary to each other and have distinctly different fields of service; both are essential.

Unlike a land station, a ship's installation cannot sprawl about, be bulky or very heavy without causing trouble. In addition it must be moisture proof, compact and solidly constructed as there is only so much room on a small boat and every inch must be utilized.

With these many restrictions in mind, the problem of selecting suitable equipment was attacked. Various circuits and arrangements were considered and many rejected because of their requiring critical adjustment or constant maintenance or being too complex for such a purpose. By a process of elimination we finally decided upon a combination whereby a single pair of 852's could be used for either high- or medium-frequency transmission by simply throwing a switch which connected their grids and plates to the proper circuit. This idea was made practicable by means of three specially designed rotary switches operated from the front of the panel. These switches make possible the combining of two different types of transmitters with a common power supply, tube equipment and antenna system without materially complicating the construction or operation of the transmitter.

The use of a pair of 852's in a full-wave self-rectifying circuit was determined upon because

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of the ease with which it was possible to obtain good operating conditions at the highest frequency to be employed. This is 12,500 kc. or 24 meters. While 203-A's would have allowed the use of lower plate voltage, they would not operate so smoothly at this frequency. In addition, a power increase of 50 watts was obtained with the 852's. They are rugged in construction and are suited admirably for operation on a small yacht where they will be under considerable mechanical as well as electrical strain.

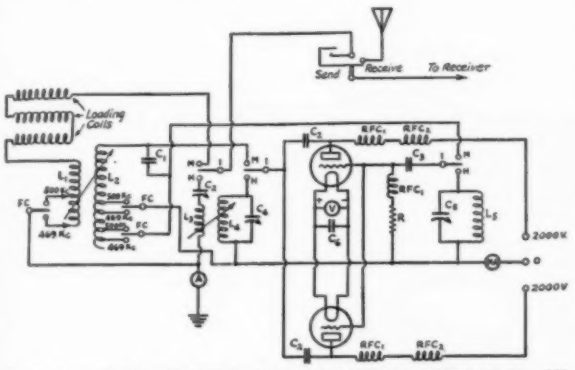


FIG. 1. — THE CIRCUIT ARRANGEMENT EMPLOYED IN THE TRANSMITTER IS SHOWN HERE

The three switches labelled 1 are controlled from a single knob and comprise one of the rotary switches referred to in the text. This is also true of the three switches marked FC. The antenna switch carries, in addition to the contacts shown, suitable switch blades to control the filament circuits of the transmitter and receiver and the starting circuit for the motor-generator supplying 500-cycle current for the transmitter. L1, L2 and the three loading coils used in conjunction with the medium-frequency transmitter are of the pancake type but are shown as solenoids for clarity. L3, L4 and L5 are suitable coils of copper tubing and comprise the antenna, plate and grid coils of the tuned-grid, tuned-plate high-frequency transmitter. The other constants are as follows:

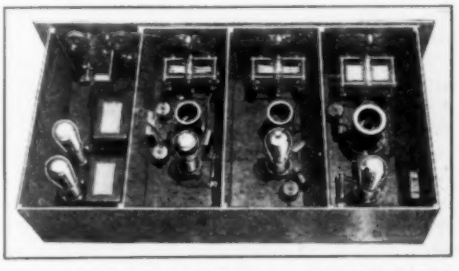
C1 — .004-μfd., 12,500-volt mica condenser.
C2 — Two .002-μfd., 5000-volt Sangamo fixed condensers in series.
C3 — .001-μfd., 5000-volt Sangamo.
C4 — .00044-μfd. Cardwell variable.
C5 — .001-μfd. Cardwell variable.
C6 — .5-μfd. fixed condenser.
C7 — .0005-μfd. Cardwell variable.
R — 25,000 ohms.
RFC1 — R.F. chokes for high frequencies.
RFC2 — R.F. chokes for medium frequencies.

A tuned-grid tuned-plate circuit is used for the high-frequency portion of the transmitter and operates at 5615, 8370 and 12,500 kc. (53.4, 35.8 and 24 meters). For the 469- and 500-kc. (640- and 600-meter) operation, a Hartley circuit is employed.

The circuit diagram and photographs show the constructional details of the transmitter. Three rotary fan switches are provided to facilitate changing from high to medium frequencies as well as to allow rapid shifting from one assigned wave to another. One of these is the change-over switch and takes care of all changes necessary when going from transmitting to receiving.

The rotary switch at the left on the transmitter panel changes the medium-frequency transmitter to either 469 or 500 kc. The 500-kc. wave is used for calling and distress and the 469-kc. wave for all general commercial traffic as well as for calling. The switch to the right of this is the usual "send-receive" switch and carries in addition to the antenna connection, additional circuit contacts for closing the tube filament and motor-generator circuits when thrown in the "send" position and cuts them out in the "receive" position. The lower center switch changes the grid, plate and antenna circuits from the high- to the medium-frequency circuits or *vice-versa*. In operating, the procedure is simplicity itself. To transmit on the medium-frequency set, adjust the frequency-change switch to the frequency desired, set the lower center switch for medium-frequency operation and then throw the antenna switch to the "send" position and press the key. To transmit on the higher frequencies, it is only necessary to throw the center frequency-change switch to the high-frequency side. The aerial switch is left on the "send" side and the other switch ignored; it is automatically cut out of the circuit. The circuit diagram in Fig. 1 will indicate the manner in which these changes are accomplished.

On the high-frequency side, while assigned three frequencies, WHDC transmits on 12,500 kc. during daylight and on 8370 kc. during the evening hours. These two channels have been found most efficient at these respective hours of the day. Tuning of the high-frequency set is readily accomplished by means of the three control dials at the right of the transmitter panel, and the three meters at the left.



THE RECEIVER EMPLOYS A STAGE OF TUNED R.F. FOR THE HIGH FREQUENCIES AND A REGENERATIVE DETECTOR ONLY FOR THE LOWER FREQUENCIES

From left to right are the two-stage audio amplifier, high-frequency detector compartment, r.f. stage and medium-frequency detector. The various units are arranged in a simple manner and are well shielded from each other.

The upper dial controls the antenna circuit, the lower left tunes the plate circuit and the lower

right dial tunes the grid circuit. These dials are calibrated for the respective assigned frequencies and marked accordingly for facilitating rapid change to any of the three frequencies. Nevertheless, a frequency meter is constantly handy to keep a close check. Before each transmission

THE FRONT VIEW OF THE TRANSMITTER AND RECEIVER

The receiver is resting on top of the transmitter. The upper meter on the transmitter measures the antenna current while the lower two are for plate current and filament voltage. The upper left-hand switch may be set for either 469- or 500-kc. transmission while the lower switch connects the tubes and antenna to either the high- or medium-frequency transmitter circuits. The upper right-hand handle operates the "Send-Receive" switch. At the right end of the panel, the upper dial is for antenna tuning while the lower ones operate the plate and grid circuit tuning condensers.

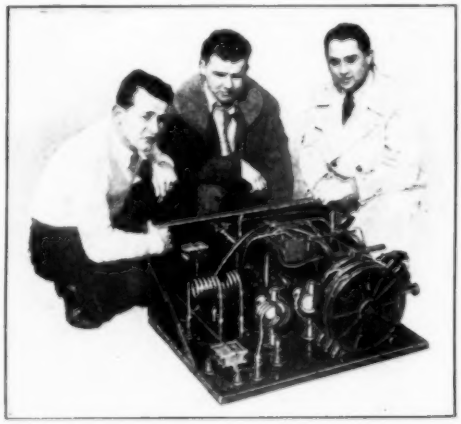
period, all transmitting frequencies are checked to assure that rolling or jars have not changed the adjustments. Operating pride motivates accuracy in this respect.

The only tuning necessary in the medium-frequency set is the adjustment of the rotary switch determining whether the transmission frequency will be 469 or 500 kc. The two pancake helices in inductive relation to each other are permanently adjusted to the respective frequencies by tap-off clips as are the three pancake loading coils set at right angles to the other two. Extensive loading was necessary to boost the short antenna having a fundamental wave-length of 134 meters to 640 and 600 meters. It was a long climb! Tests are not yet completed but indications are that this medium-frequency equipment will exceed our expectations and give a fairly decent range even though it may be operating under such difficult handicaps. However, most of the medium-frequency work will be done at short range, the more dependable and trustworthy high-frequency transmitter being entrusted with the DX and heavy-duty work.

The power supply for the transmitter is located in the engine room, a space not over ten by eight feet, that contains an assortment of machinery seldom found on such a small craft. Along the forward port side and immediately aft of a partition of the radio cabinet, is the power supply consisting of a Crocker-Wheeler 500-cycle motor-generator unit, the motor of which has been rewound to run from the 32-volt d. c. supply of the ship's Edison batteries. A suitable control panel is provided and carries the necessary d. c. and a. c. meters, auxiliary and main line switches and the field control for the radio motor-generator.

A battery of 25 cells of 112-ampere-hour Edison storage cells provides constant source of power. These may be charged by either a 2.5-kw. U. S. Motors marine lighting plant or a Westinghouse 1-kw. shunt generator driven by the main propelling engine through a belt. In addition to this equipment, this tiny room also contains the main propelling engine, storage tanks for 130 gallons of water, 520 gallons of gas and 50 gallons of lubricating oil; an ice refrigeration generator driven by a 32-volt motor; bilge pumps and an auxiliary gravity-feed tank for emergency use with the main lighting plant. It is easily seen that not an inch of space is wasted, yet with all this equipment installed there is still ample room for a two-foot passage around the main propelling plant and all apparatus is readily accessible for adjustment and repair.

It is extremely desirable to have more than a single source of energy for the transmitter and in this case there are four separate power sources. The motor-generator may be driven by the 2.5-kw. lighting plant directly with the batteries floating on the line and charging; it can be excited by the 1-kw. Westinghouse generator driven by the main propelling engine with the battery



A REAR VIEW OF THE TRANSMITTER

From left to right are Stephens Miranda, operator of WHDC; Otto Johnson, W7FD, designer and builder of the equipment; and Daniel Blum, the other organizer of the expedition.

across the line; or the battery may be used directly with both generating plants inoperative; and lastly, any 110-volt a. c. city supply may be used without the motor-generator running. This

last arrangement is made possible through the use of a 750-watt 60-cycle transformer which is normally used with the 500-cycle supply from the motor-generator. This is an important factor and permits WHDC to use city supply whenever docked and such is available.

As might be anticipated, the problem of designing an antenna system to be strung in such limited quarters and capable of radiating at such widely different frequency bands was not a simple one. Designing for one service seemed possible only to the detriment of the other. A four-wire flat-top inverted L of 22 feet was first erected. It was suspended between two seven-foot spreaders on the ship's masts, being about 55 feet high at one end and 45 feet high at the lead-in. The lead-in was strung on stand-off insulators directly down the mast to the engine room skylight where it passed through pyrex insulators across the room to a lightning switch mounted over the motor-generator control panel.

Tests with this radiator developed four distinct faults. The worst of these was the loss of balance of the ship caused by the bulky weight of the antenna suspended at such a height above the body of the boat. Secondly, when under weigh and rolling, operation of either transmitter or receiver was impossible due to extreme signal swinging. Thirdly, the stand-off insulators impaired the facilities for lowering and raising the mizzen sail as it runs on hoops up the main mast. Lastly, while the flat-top benefited the efficiency of the medium-frequency set, it did not allow good tuning conditions to be obtained with the high-frequency transmitter.

In place of the flat-top, we tried a cage antenna consisting of 12 wires twisted together in groups of three so as to form a four-wire system approximately 21 feet long and 12 inches in diameter with a 48-foot single-wire lead-in run directly from the cage-end to the engine room skylight lead-in insulator as before excepting that no stand-off insulators are necessary. The fundamental of this system was 134 meters.

The ground consists of a connection to the main propelling engine and another through the hull to two copper plates mounted on either side of the propeller. These two plates are connected together by a welded copper strip which also passes over the propeller shafting thus connecting it to the internal ground on the main engine.

With this radiating system the effects of rolling are noticeably less. Stations which previously came in fair only to fade out entirely when the boat rolled now came in strongly and showed very little swinging or fading except in an unusually bad sea-way. Over 100 stations have been copied at a distance of 5000 to 8000 miles with signal strength of R8 and R9 (QSA3-5). Likewise in transmission where difficulty was previously experienced in "getting out" we have established excellent communications working from Seattle while docked beside the Jensen Motorboat Corp. QRN in this district is extreme due to power lines, local conditions and propelling machinery of small boats that ply back and forth on Lake Union within a hundred yards or so of the *Nomad*. However, WHDC has worked stations in New Bedford, Mass.; Charleston, Va.; Honolulu; New Zealand; Lafayette, Ind.; Chicago; San Francisco and Los Angeles. This is to be considered as quite excellent when

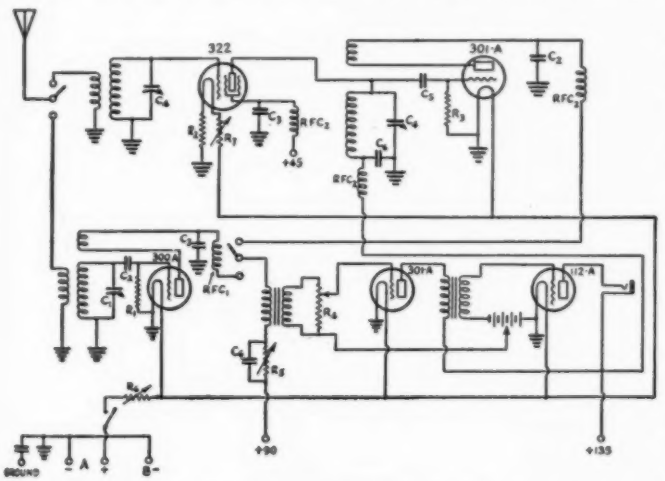


FIG. 2.— THE COMBINATION CIRCUIT FOR THE TWO RECEIVERS APPEARS ABOVE

The two switches are a single unit and shift the audio amplifier and antenna to the desired detector circuits. The constants are:

C1 — 350-μμfd. taper-plate Cardwell.
C2 — 500-μμfd. Aerovox fixed condenser.
C3 — 2000-μμfd. Aerovox fixed condenser.
C4 — 150-μμfd. taper-plate Cardwell.
C5 — 150-μμfd. Aerovox fixed condenser.
C6 — 1-μfd. Tobe by-pass condenser.
R1 — 3-meg Durham leak.
R2 — 15-ohm Carter resistor.
R3 — 8-meg Durham leak.
R4 — 500,000-ohm Carter potentiometer.
R5 — 300,000-ohm Carter variable resistor.
R6 — 10-ohm rheostat.
R7 — 30-ohm rheostat.
RFC1 — Silver-Marshall No. 276 choke.
RFC2 — Silver-Marshall No. 275 choke.

The plug-in coils are Silver-Marshall as are the audio transformers.

it is remembered that WHDC transmits entirely out of the amateur bands. In general amateurs do not usually listen on the frequencies assigned for operation to WHDC and many calls have undoubtedly gone unacknowledged because of this.

The receivers are not quite so complex as is the transmitter. They do, though, involve the same principles in that the medium- and high-

THE RADIO "SHACK" IS A CABINET AS MAY BE SEEN ABOVE

The transmitter is mounted above the receiver and the lower portion of the cabinet cover becomes a writing table when let down.

frequency sets are combined in one cabinet and a single switch is used to change from one set to the other. Tuning is accomplished by means of three dials that control the entire frequency range of both sets.

Plug-in coils are provided and the high-frequency receiver which employs a stage of tuned r.f. amplification using a screen-grid tube covers from 2700 kc. to 18,750 kc. The medium-frequency receiver used a straight regenerative detector employing a C-300-A tube. It covers from 200 to 1500 kc. A two-stage audio amplifier having a 112-A as the last tube is common to both sets. This makes the sets suitable for broadcast reception when that is desired.

The first tuning dial at the left end of the receiver panel controls the medium-frequency regenerative detector. The remaining two dials are for the high-frequency detector and r.f. amplifier. The four small knobs at the extreme right of the panel are the various tube controls. The upper left controls the filament circuit of the screen-grid tube while the upper right takes care of all tube filaments. The lower left knob is the resistance control of regeneration and the remaining knob is for the potentiometer which acts as the volume control. In the center of these four knobs may be seen the double-throw telephone-keyboard switch by means of which the audio amplifier and antenna circuits are connected to the proper r.f. circuits.

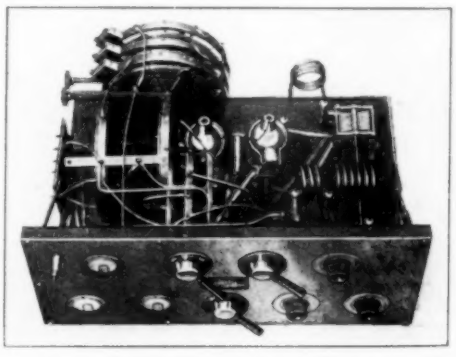
The designer and builder of WHDC is Otto Johnson, W7FD, of the Seattle Radio Laboratories. He is also the Section Communications Manager of the Washington Section and requires no additional introduction to League members.

The *Nomad* sailed from Seattle on March 10th and reached San Francisco after fourteen days on a storm-ridden sea during which it rode out over forty squalls of hurricane force. After a short stop-over we will proceed to Los Angeles where motion picture equipment will be taken aboard. A schedule will then be decided upon between Charles Hill, W6BRO, who has completely rebuilt his station in order to be prepared for the handling of the many schedules to be run, and the writer. Hill will be the official contact man of the expedition.

After these matters are attended to, the *Nomad* will embark under the auspices of the Adventurers of the World, an international explorers club, for the Mexican coast and Panama.

The itinerary will then take the ship in its search for unusual literary and photographic data to the South Seas where it will call at the Marquesas, New Hebrides, New Guinea, New Zealand and other islands in the South Pacific group. From there the plan is to beat our way to Australia, the Philippines, China, and Japan. Following this we sail along Siam, Africa, and thence to the Mediterranean sea-ports, finally reaching the North Sea. In turn, the Continental countries will be visited.

The return to America will be made by way of the South Atlantic via Brazil. We will sail up



A TOP VIEW OF THE TRANSMITTING SET

The high-frequency equipment is to the right while the larger pancake inductances are employed for the 500-kc. portion of the set. The long handles on the panel control the switches for changing from transmitting to receiving and also determine the frequency of transmission.

the east coast of this country to Cuba, thence setting our course through the Panama Canal and

(*Continued on page 82*)

Photo-Electric Cells and Methods of Coupling to Vacuum Tubes

By Thornton P. Dewhirst*

THE photo-electric cell has grown to be a well known article in the last few years and with the advent of talking movies, radio photos, telephoned pictures, and increased activity in television experiments, promises to become a very important piece of apparatus to every experimenter.

The cell is a device for changing light values into electrical values. Probably selenium is the best known device of this kind. The alkali-metal cell, however, differs radically from the selenium cell and when light is incident upon the sensitive material it liberates electrons which are attracted to an electrode provided for that purpose.

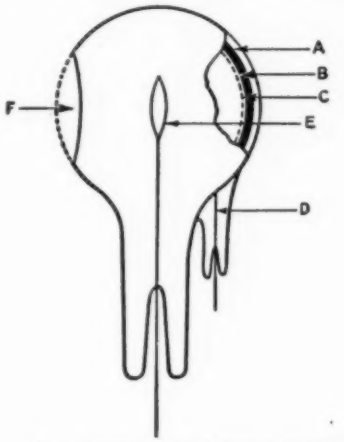


FIG. 1.— THE GENERAL CONSTRUCTIONAL DETAILS OF A PHOTO-ELECTRIC CELL ARE SHOWN ABOVE

The glass envelope, A, which is usually of pyrex or quartz is coated on the inside with a deposit of silver, B. Upon the silver is a film of the light-sensitive material, C. At D is a wire embedded in the glass and making contact to the silver coating which is the cathode. The anode, E, is a ring or loop of wire and is supported from a stem through which the lead wire passes. A window, F, is cleared of silver and allows the light to enter the cell and affect the light sensitive material. The envelope may be highly evacuated or may be filled with gas at low pressure.

Fig. 1 shows the general construction of such a cell. It consists principally of a glass container which is commonly made of quartz or pyrex. This type of glass permits the passage of ultra-violet light to which the cells are very sensitive. This shell is baked and de-gassed and a silver coating deposited on the inside of the bulb. Contact is made to this silver coating by means of a wire embedded in the glass and the metal, potassium, is caused to be deposited on the silver surface. Hydrogen is now forced into the tube and a glow discharge produces the desired potassium-hydride surface. This glow discharge is maintained between the surface above referred to which is known as the cathode and a centrally located metal ring. The metal ring, known as the anode, is shown in the figure and is made positive. It is the electrode to which the electrons are attracted under the influence of the cell battery.

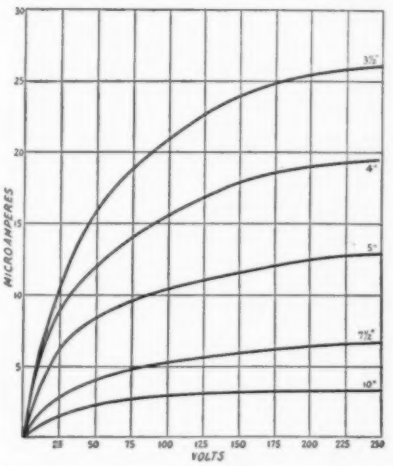


FIG. 2.— THESE ARE CHARACTERISTIC CURVES FOR A HIGH-VACUUM CELL

They give the current through the cell for varying voltages impressed across it. The source of light employed was approximately equivalent to a 200-watt Mazda lamp operated at 115 volts. The numbers on the curves indicate the distance between the source of light and the cell in inches.

As is indicated in the figure a window is made in the light sensitive material by the application of a torch to the desired surface during the process of manufacture. It provides a means of admitting light to the interior of the bulb so that it might fall upon the light sensitive material. The bulb is pumped free of hydrogen and sealed up, in the case of high-vacuum cells. In the case of gas cells, after the hydrogen is exhausted, argon gas is admitted to a given pressure and the tube sealed off.

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Regarding the operation of the cells, the potassium-hydride surface and the silver coating upon which it is deposited, together, might well be compared to the filament of a vacuum tube in that it is the source from which the electrons flow to the collector ring which would then correspond to the plate of a two-element tube. The number of electrons available, however, is exceedingly small compared to that available from a tube filament.

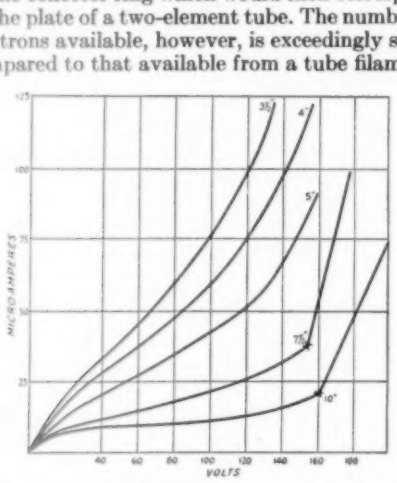


FIG. 3. — THESE CHARACTERISTIC CURVES ARE FOR A GAS-FILLED CELL

The source of light in this case was approximately equal to a 100-watt Mazda lamp operated at 115 volts. It will be apparent from these curves that although a lower maximum voltage is applied to the cell and the source of illumination is weaker, the currents obtained are much greater than for the high-vacuum cells. As in Fig. 2, the distance between the cell and the source of light is indicated on the curves.

As stated above, two standard types of cells are in general use. The high-vacuum type whose response is linear over a considerable range, but the output of which is rather low; and the gas-filled type which, while rather limited in linear response range, furnishes a much greater output.

Fig. 2 shows the characteristics of the high-vacuum type cell. The numbers on the curves indicate the distance in inches between the source of light and the cell. We see that as we increase the cell voltage, the illumination remaining constant, the current output increases up to a certain point after which it remains rather constant. Also we note that as the light is made more intense (moved closer) we get an increased current.

The curve shown in Fig. 3, which is for the gas-filled variety, also shows the same characteristics with the exception that the output is greater and as we increase the voltage the rise in current is more rapid. One important fact to be guarded against when using this type of cell is that as the voltage is increased near to the ionizing potential of the gas, a strong light will cause the cell to glow. This glowing is harmful to the cell and the cell should not be left in this condition for any length of time. It will be necessary to remove the voltage applied to the cell before this glow will disappear; the mere removal of the light does not stop the cell from glowing. For every combination of light and voltage above a certain limit there is a point at which gas cells will glow.

To show the linear characteristics of the photo-electric cell, we can take the family of curves shown in Fig. 2, and cross plot from them and get the curve shown in Fig. 4. This curve is obtained by plotting the current output of the cell at a fixed voltage against the distance between the source of light and the cell, the brilliance of the source remaining constant. If, now, we take this curve and change the constant light source and variable distance into light intensity ratios, we can readily see that the response is directly proportional to the light flux incident to the cell as shown in Fig. 5. To obtain this light intensity ratio, as used above, we can use the formula:

$$I = \frac{K}{d^2}$$

where K is a constant and d is distance. For simplicity, we will assume K equal to 1, and our formula merely states that the light flux is inversely proportional to the distance squared.

For instance, in order to obtain Fig. 4, we took a point on the abscissa of Fig. 2, which represented a voltage of 175 volts and found the value of current corresponding to the different distances. When these values are plotted on a distance versus current output graph, Fig. 4, is the result.

Now, to obtain Fig. 5, we apply the formula given above. For a distance of 10 inches

$$I = \frac{1}{10^2} \text{ or } 0.01; \text{ for 5 inches, } I = \frac{1}{5^2}$$

or 0.04; and so on. Next we plot these values on a light intensity versus output graph; and in so doing, we obtain the values shown in Fig. 5,

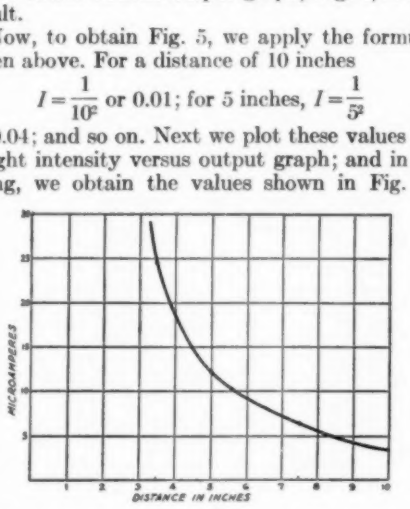


FIG. 4.—This curve is for a high-vacuum cell and shows the relationship between the current output of the cell and the distance between the cell and the source of illumination which is approximately equivalent to a 200-watt Mazda lamp operated at 115 volts.

indicating that the current is directly proportional to the intensity of light falling on the cell.

We might have calculated the light flux falling on the cell in lumens in each instance in which case the curve or more correctly the rectilinear

graph of Fig. 5, would have been arrived at directly. However, such a procedure would have involved more calculations and no doubt would not have been near so instructive as the above. Also, in the above, neither the intensity of the light source, nor the size of the aperture entered into the calculations directly. Nevertheless it might be well to say here that it is now becoming common practice to grade cells in microamperes per lumen. To define a lumen technically or mathematically would involve considerable calculation and a multitude of definitions and since we avoided that above we shall let it suffice to say that the light passing through an aperture or falling on a surface one and one-half inches square

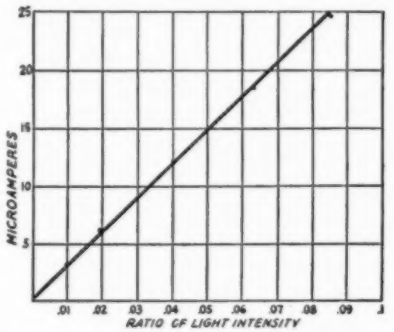


FIG. 5.— THE RATIO OF LIGHT INTENSITY IS HERE PLOTTED AGAINST THE OUTPUT CURRENT

In this particular case the relationship is linear and indicates that little or no distortion would be caused due to a change in the intensity of the illumination. This, of course, considers only the cell and takes no consideration of distortion that may occur in the electrical equipment associated with it in general operation.

placed ten inches from a 150-watt lamp operated at 115 volts is approximately one lumen.

It will be noted that the response of the cell described is practically directly proportional to the illumination at any voltage above 150 volts.

However, in the case of the gas-filled cells, which are most generally used in television and sound pictures, it will be found that the linear response is not so easily obtained. With special care in their construction and manufacture and if operated at the proper voltage in a given range of light values, there can generally be found a range over which the illumination current relationship may be kept linear. The gas-filled cells give approximately ten times as much output as the vacuum type cells; outputs ranging from five to fifteen micro-amperes per lumen being rather easy to produce. The reason for this increased output is due to the fact that as the electrons emitted from the potassium travel toward the anode, some of them collide with molecules of the gas with which the cell is filled. The result of such a collision is usually that one or more of the electrons of the molecule is knocked out of its orbit and leaves the molecule. Instead of just the original electron traveling on to the anode we may now have two or more electrons going there. In addition to the increased number of electrons

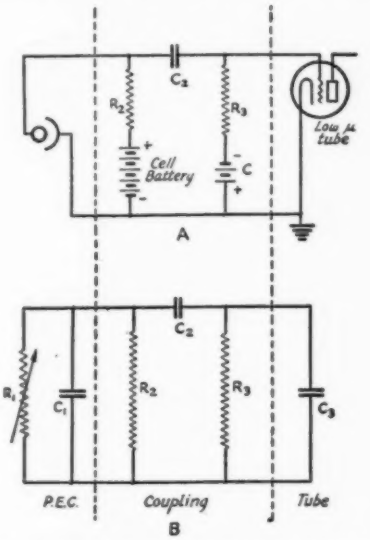


FIG. 6.— THE UPPER PORTION LABELLED A GIVES THE SCHEMATIC DIAGRAM OF THE COUPLING BETWEEN THE CELL AND THE GRID OF THE TRIOD

In the lower figure, B, appears the equivalent network for this. C_1 and R_1 replace the photo-electric cell and C_3 corresponds to the input capacitance of the triod.

reaching the anode, the molecule which lost an electron or two becomes, because of this deficiency, positively charged and travels to the cathode which is the most negative body in the cell.

If the number of electrons liberated from the cathode becomes too great for the space within the cell and causes too many collisions or if the voltage across the electrodes is increased beyond a certain critical value and allows the electrons traveling between cathode and anode to reach too high a velocity, thus increasing the number of electrons that can be knocked out of the gas molecules, the gas will become completely ionized and will glow. This ionization has been referred to above and is not an operating condition of the cell; it is damaging and should be avoided.

Some typical curves of gas-filled cells are shown in Fig. 3.

So much for the cells themselves. Let us now consider the method of connecting them to a vacuum tube so that we may amplify their output. First we have in the cell circuit a polarizing battery to draw the electrons from the sensitive material. In order to accomplish this we make the electron emitting metal negative and connect the positive of the battery to the remaining electrode,

generally the center one, which we have called the anode. In series with the polarizing battery we now place a resistor, the drop across which we expect to utilize. Upon first consideration we would make this resistor rather high in order to

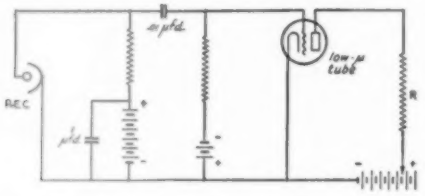


FIG. 7.— A GOOD CIRCUIT FOR GENERAL TELEVISION WORK IS GIVEN ABOVE WITH CONSTANTS INDICATED

The tube may be a 171-A, 112-A or 201-A with preference to the first mentioned one. A 199 or WX-12 will give an increased gain but will result in a slight sacrifice in the linearity of the frequency response. The plate resistor, R, will vary between 5,000 and 50,000 ohms depending upon the tube and plate voltage.

produce the so-called "match" between the cell and the load. However, upon still further consideration we find that the value must be relatively low unless we are dealing with low frequencies such as encountered in relay action, in which case only the precaution in regard to leakage need be observed. That is, the value of resistance must not be so high that the tube leakage and possibly the resistor mounting possesses a resistance comparable to the value of the resistor itself. Let us complete the coupling to the tube and then return to the various factors affecting the choice of values for the several elements. From the polarizing resistor we will couple through a condenser and grid leak to the tube in the regular fashion used in resistance-capacitance amplifiers. This tube should be of as low a mu as possible when high frequencies are to be amplified.

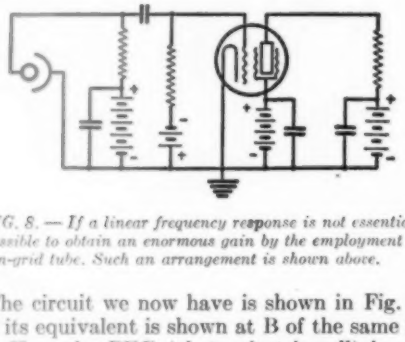


FIG. 8. — If a linear frequency response is not essential, it is possible to obtain an enormous gain by the employment of a screen-grid tube. Such an arrangement is shown above.

The circuit we now have is shown in Fig. 6A and its equivalent is shown at B of the same figure. Here the PEC (photo electric cell) is considered as a small capacity, C_1, which is shunted by a high resistance, R_1. The resistance of the cell is dependent upon the voltage across it and the amount of illumination it receives. R_2 is in series with the cell and the two are shunted across the cell battery which causes a current to flow through them. This current causes a certain voltage drop across R_2 which is applied to the grid of the tube. As the resistance of the cell varies with the amount of incident light, the current from the battery varies and the drop across R_2 varies. It is this varying voltage across R_2 that is responsible for the signal applied to the grid of the tube.

C_3 is the coupling condenser which prevents the voltage of the cell battery from being applied to the grid of the vacuum tube and R_3 is the gridleak through which grid bias is obtained. In Fig. 6B, R_1 denotes the resistance of the cell and C_3 is the input capacity of the triod.

We will now consider the circuit in regard to the values required to cover a wide range of frequencies. In regard to the choice of R_2, as stated above, we would like to make this resistance as large as possible in order to have a large voltage available. We must not, however, make it so large as to produce an appreciable voltage drop and thus affect the polarizing potential applied to the cell and possibly introduce distortion. Also it should not be so high as to compare favorably with the reactance of C_1 at the highest frequencies

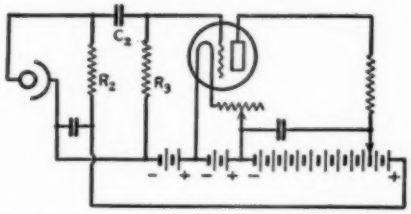


FIG. 9. — This arrangement makes it possible to employ the same battery to supply voltage to the plate of the triod and the photo-electric cell at the same time. If this circuit is used for operating a relay, R_2 and C_2 should be large and R_3 rather small.

desired. This is a consideration of extreme importance in dealing with large cells. A low value of R_2 also helps the high frequency response on the tube end, that is relative to C_3, which is the input capacity of the tube; R_2 and R_3 may be considered as in parallel in respect to this capacity and therefore the lower this value the better the response at the high frequencies. The use of a high-mu tube is accordingly undesirable because its input capacitance will be large as is indicated by the formula:

$$C_i = C_{gf} + (\mu + 1)\ C_{gp}$$

where C_i = effective input capacity

C_{gf} = grid to filament capacity

C_{gp} = grid to plate capacity

μ = amplification factor of the tube.

If a flat response is not so essential over a given band of frequencies the value of R_2 may be increased and a corresponding gain in output in the medium-frequency range produced. Here a high-mu tube might even be used to considerable advantage.

The President's Corner

A WORD FROM

HIRAM PERCY MAXIM

PRESIDENT OF THE AMERICAN RADIO RELAY LEAGUE AND OF THE INTERNATIONAL AMATEUR RADIO UNION

Self-Control

SOMETIMES I marvel that amateur radio has attained the high place it occupies. Considering what easily might have happened in all these years, it almost seems as though amateur radio were a child of destiny.

We amateurs could interfere with and seriously disturb every form of radio communication. There is no highly-organized police system constantly watching to prevent us. There are thousands and thousands of us. Notwithstanding, we have an unbroken record of fourteen years of improving prestige. In the United States we are regarded as an important national asset, and when an international radio congress convenes our government gives us the full weight of its influence to help us maintain all the space in the spectrum that can be got. The years of consistent high-quality conduct have won this.

Among the older ones of us, it is not surprising that an orderly behavior should have been maintained. We older men know from hard experience the losses that follow behavior not for the general good. But most of us are young and cannot yet have learned this most important of all life's lessons. And what is more, fresh groups of young fellows join us every year. They cannot have acquired the traditions of amateur radio and the A. R. R. L.

And yet, something is conveyed to every one who enters amateur radio that makes him keep in line.

What is it? Whatever it is, let's preserve it. It has worked marvels for fourteen years.

In choosing the value of C_2 and R_3 for maximum response at high frequencies, C_2 should be small in order to minimize the capacity of the condenser to ground which would be large for a large condenser due to its physical size. At this point it might be well to say that all wires should be as short as possible and run as free from other wires and apparatus as is convenient; also all shielding should be well spaced from these leads — never use braided shielding or lead covered wire but run the leads down the center of an oversize piece of tubing, say 1" in diameter — in order to minimize the capacity to ground. To get back to where we started, we chose a small condenser, therefore, the value of R_3 must be rather large in order to bring up the low frequency response. There is always room for a considerable amount of juggling here, since we make the value of R_3 extremely large we begin to affect the high frequency response on the tube side because of C_3. Making C_2 larger will let us make R_3 smaller and may be desirable in some cases.

The choice outlined above of small R_2, small C_2, fairly large R_3 and a low-mu tube will be found to give extremely satisfactory results, when covering a wide band of frequencies.

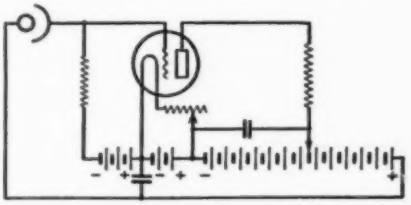


FIG. 10. — This is a still simpler arrangement for operating a relay by means of the cell. It is not as sensitive as Fig. 9 because a single resistor acts as grid leak and carries the polarizing current as well.

In regard to the rest of the amplifier little needs to be said; make sure that it has the frequency response desired. Well designed transformers may

(*Continued on page 25*)

The Pied Piper of Hamelin

A "1929" Edition of an Old Story

By Uncle Jimmy

DEAR, *dear* little Hams:

Settle the cans over your ears and make yourselves comfy, because Uncle Jimmy is at the mike and he's going to tell you a darling little bedtime story. You won't have to go to bed right away after the story, either, for Uncle Jimmy wants to talk to you kinda serious and he has asked Mamma and Papa Ham (Ma and T.O.M.) to let you stay up a little longer tonite.

Well sir, it was a funny thing that happened to your old Uncle Jimmy. Maybe I went to sleep with the cans on — maybe not — but, anyway, I tuned in an honest-to-goodness *fairy!* It was a little fairy ham right from Hamelin Town. I knew right off that it was the Pied Piper, himself;

I knew him by his sweet little d.c. note. It was that note, you know, that made all the little Hams follow him around like they did in the story-books.

The Piper was a funny little fellow, not much taller than the receiver panel, and I couldn't help but laugh when he attempted to scowl at me. That little face wasn't meant for scowling. He stamped his little foot angrily and spoke: "Uncle Jimmy, I'm ashamed of you. You're drunk again!" Well, that sorta got me because I was sober as a judge and I never touched hard liquor anyway. I was just a little provoked.

Now fairies are queer folks; they can read your thoughts like so much Continental. Piper gave me another hard look and went on: "Don't get uppish; you know what I mean. You're on a mental drunk. You have a lot of unorthodox ideas about radio an' I'm here to tell you you better get rid of 'em if you want to ever amount to anything! First thing you know, the Who's Who in radio will say 'thumbs down' and you'll be out of a job —.

"But wait! I can see by your thoughts that you're not in the radio business; you're just a ham and, as such, are entitled to all the crazy notions you like. Well, well; I'm sorry!"

We shook hands merrily. Piper laughed till he wabbulated. "Gosh, that was a funny mistake," he said. "You know I read some of your stuff in *QST* and I thought I'd better come around and warn you that you were skating on the same sort of ice as was the preacher who wanted to hold dances in the church gymnasium."

Piper's merry little eyes twinkled as he took a slip of paper out of his tiny pocket. "Since you're not one of the preachers, I can show you a cartoon I drew. It's called Fig. 1 and it's supposed to represent a horizontal Hertz. It's all out of shape so that a fellow can see its innards. The little dots represent free electrons that have been magnified a few billion times.

"At A, the Hertz is supposed to have somehow received an electrical jolt which forced a lot of the free electrons to one end of the antenna. The electrons are all negative and they don't like being squeezed together because like things repel. The natural tendency of these electrons is to redistribute themselves evenly throughout the conductor. We call this tendency capacitative reactance.

"Inductive reactance is like the country politician. It's 'agin' everything! It puts up a stiff fight at first and finally yields completely, being the reverse of capacitative reactance which resists but gently at first and finally brings the electronic procession to a complete halt.

"The aim of capacitative reactance is to bring the electrons from the position of A to that of B and there to stop. Inductive reactance is 'agin' starting, but finally yields and, when the objective is reached, is 'agin' stopping, so that the procession travels on until again stopped as at C by capacitative reactance."

Piper stopped and looked into my eyes mischievously. "See anything wrong with the picture so far?" he asked.

"Why — uh — yes," I replied. "The textbooks always have dotted lines drawn between antenna and ground to show where the capacity comes in. You know you have to have both capacity and inductance to tune a cir —."

"No, I don't know any such thing!" he broke in. "Of course, both capacity and inductance are

going to be present in any circuit — tuned or otherwise — but let's just *suppose* that we can eliminate capacity entirely. The circuit will still be tuned because it will possess capacitative and inductive *reactance* — that's what counts.

"The effect of capacity is shown at D. The crowded electrons in the left leg can see two ways of returning to a normal balanee, but only one way is possible because of the insulating gap. The attraction across the gap serves to cause a little delay — reduces the frequency.

"Here's a pair of fairy definitions: Capacitative reactance is the tendency of the free electrons in a conductor to preserve a state of electrical equilibrium, and capacity is simply a means of reducing capacitative reactance.

"The first definition is really too narrow because capacitative reactance actually tends to keep *all matter* in a state of electrical balance — just as gravity tends to keep water in a state of mechanical balance. Since 'all matter' includes nonconductors as well as conductors, a fellow can see how electrical waves can exist in a dielectric — such as air. Of course, actual current-flow can only take place in a conductor where there are free electrons that can skip from atom to atom, but displacement 'currents' can 'flow' quite readily in a dielectric. The idea is that the electrons belonging to an atom, being disturbed, swing out in the electrical breeze and transmit the

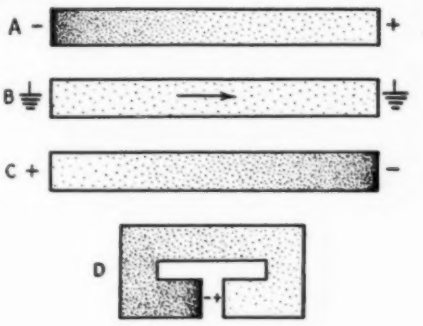


FIG. 1

disturbance to adjacent atoms which, in turn, jar their neighbors and so on and on. Not an electron leaves its atom, but the impulse travels like actual current-flow and is subject to inductive and capacitative reactance."

"Yes," I interrupted, "it's not hard to see how radio waves travel through dielectrics, but how do they cross interstellar space?

"The men of science drag in the ether theory. Ether is something which is supposed to be nothing and pervades all space. If it pervades space, where is the space? Or, if it is nothing why talk about it?"

Piper changed to an apparently irrelevant subject. "Say, Uncle Jimmy, I'm going to tell you how to secure a perfect vacuum in a 'vacuum' tube. Construct a very tall tube — if it isn't tall enough, make it taller — put all three electrodes in the very top of the thing and pump as much air as you can from the bottom. Gravity will now cause the residual air to settle (?) to the bottom, leaving a perfect vacuum at the top!

"Oh! Gasses like to disperse, do they? Then consider this: Some gasses weigh so little that a

balloon filled with them will lift almost as much weight as the weight of the air it displaces. Suppose we release a quantity of such very light gas. It will rise to the upper limit of the atmosphere — if there is a limit. The farther the gas recedes from the earth the less it will weigh because the gravitational attraction will be lessened by the distance. As it recedes from the earth, the surrounding atmosphere will be less dense and exert less pressure on it. It will, therefore, expand in its effort to fill all the available space. Which will win, the attraction of gravity, or the tendency of gasses to fill every nook and cranny of 'space'? Suit yourself, but don't forget that the very same scientists who claim that interstellar space is a void, insist that 'nature abhors a vacuum!' Yes, 'space' is filled with atmosphere; it's darn thin, but it's there."

Uncle Jimmy wants you little Hams to remember that he is just telling you what Piper said. I'm not saying that it's *true*. Don't try to tell it to big brother, R. E. Ham, because he won't believe it. He doesn't *believe* in fairies.

"Let's talk some more about wave propagation," suggested Piper. "I can see that you're kinda dumb about such things." He fished another piece of paper out of his tiny pocket before I could decide whether or not to get mad. "This is Fig. 2," he said. "It shows how light waves get bent when they pass at an angle from a dense to a thin or a thin to a dense medium. I drew double lines to show that the light beam has dimensions. Now, Uncle Jimmy, do you know *why* the wave changes its direction of travel?"

"I don't remember of anyone ever telling me why."

"No," said Piper, "they usually don't try to tell that part of the story. Well, here's why: Light travels faster in a thin medium than it does in a dense one — faster in air than in glass, for example."

"But the velocity of light is constant!" I protested. "You're wrecking the relationship between wavelength and frequency!"

"Wavelength my eye!" snorted Piper. "That's out. Shut up; and don't interrupt me again." (Fairies are *so* short tempered!) "Look at the picture and you will see that there is an instant

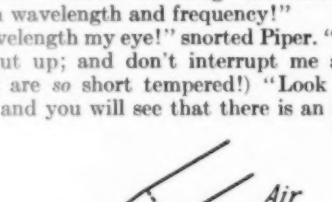


FIG. 2

when one side of the beam is in one medium and the other side is in the other. During this instant, one side of the wave travels faster than the other. Naturally, it *turns*.

"Even a slight difference in the density of the mediums will cause refraction of light, as you can prove by noting the distorted appearance of the objects viewed over the top of a hot radiator or stove. The density of our atmosphere decreases with increase in altitude. This difference in density refracts light waves a little. It refracts radio waves to a greater extent because the dimensions of the radio wave are greater than the light wave and one side of the radio wave is in a medium much denser than is the other.

"Oh, sure; the Kennelly-Heaviside layer is there, all right, but I wanted to point out that it isn't the only thing that affects the direction of radio waves. If it were, the Warner Splatter System wouldn't work.

"Well, Uncle Jimmy, I'll have to say '73' and 'CUL' because the rat business is pretty heavy of late and it doesn't leave me much time for DX. I worked Jupiter last night with three ergs input to my pipe."

Piper grasped the antenna and vaulted lightly into space. Something — perhaps the reactance caused by Piper's exit — struck me between the eyes. With the return of consciousness came also the dawning realization that I was seated in the midst of what was once a slop rectifier and holding the new "1929" receiver in my lap. It was almost as if I had dropped asleep and fallen out of my chair, but I knew I hadn't for from the vast dim distance came a laugh — Piper's laugh.

Now, dear little Hams, Uncle Jimmy has told you a nice bed-time story — a fairy tale — and he has told it for a reason. It is quite probable that everything I have said is all nonsense. There is the possibility, though, that some of it is on a par with Mr. Warner's famous Splatter System, *some* of it *may* be right. (No, no Officer! Mr. Warner is entitled to the first ride in the nice wagon!)

The purpose of the fairy tale is to point out that there are no flanges on the imaginative wheels of a mere Ham. He isn't hampered by the knowledge of So-and-so's Law and of such-and-such an equation that must be satisfied. He can't see the hundred-and-one reasons why his theory must be wrong. The marvelous part of it is that the ham is sometimes right.

A boy once said: "I have a kite. It is heavier than air, yet it flies. Someday I will fly like that!" Learned engineers pointed out to the boy that the scheme was impossible. Their argument ran something like this: If the weight of the kite is doubled, twice as much surface will be needed to support it, *but* if one starts by doubling the surface, he will find that he has increased the weight about four times in order to keep the same proportion of structural strength. A kite, they said, with enough surface to support the weight of a man would be too heavy to lift itself! The engineers deserved to be right. They had given the problem deeper study than had the boy. They were hampered, though, by their own knowledge! We all know that the *boy* was *right*.

We can depend upon scientists and engineers to develop new territory to the limit after we have discovered it, but the burden of discovery rests upon our shoulders. An eminent engineer cannot risk his reputation by talking about fairies until he has positive proof that fairies exist. I can. *You* can. We have nothing to lose by being wrong and have everything to gain if we should happen to be right.

Another thing: I know some fellows who have a lot of original "kinks" in their shacks. These fellows don't mean to be stingy with their ideas; they are merely *afraid* to send them in for *fear QST* will turn them down. Gosh! I wish *QST* would turn down my stuff. Whenever that happens, I will know that the editors have been able to fill *QST* with material better than mine. That won't be bad luck for anyone! The best of whatever comes in is printed in *QST;* if that "best" is sometimes pretty poor, it's our fault — *your* fault!

In a recent editorial, Mr. Warner said: "There is a great shortage of *QST* material." Editor Warner shouldn't have had to say that. *QST* belongs to us — to the membership of the A.R.R.L. We can't get any more out of our magazine than we put into it. The principal reason for the existence of *QST* is to provide a place where the members of the A.R.R.L. can swap ideas. Chewing the rag over the air is fine business and I do a lot of it, but when a fellow wants to swap ideas with all of Hamdom, he needs the pages of *QST*.

Do you think that a fellow fully pays his way to a convention when he planks down the price

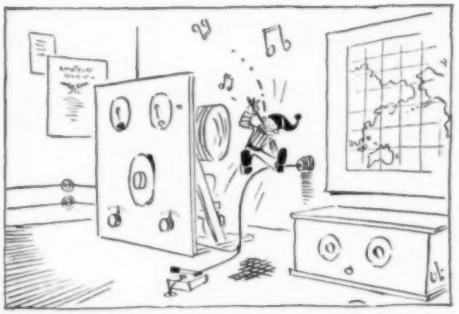
of the banquet? He doesn't. The fellow who goes to a convention with the idea of absorbing all the valuable information he can without giving a thing in return from his own store of knowledge isn't quite honest! You may *get* a copy of *QST* for a *quarter* — but you can't *pay* for it in that way. Let's be honest.

There isn't room for all of us to push; some must ride, but we can only discover the best pushers (many of whom are still hidden lights) by everyone *trying* to push.

I am not trying to set myself up as a shining, unselfish example; this is really written for a selfish reason. It's like this: *QST* is priced at two-bits per copy. I feel that I am only getting about thirty-five cents worth out of it. I am beset with a hunch that we can raise the value (not the price) to four-bits. In other words, I want to double my money on a sure thing!

All this sounds fine, but I have lived long enough to find out that we very seldom, if ever, get something for nothing. I have learned that the statement, "Honesty is the best policy," is a truth. Please note that the statement has nothing to do with morals. Emphasize the word, *policy*. The more willing we are to pay, the more likely we are to get our money's worth. The fellow who thinks he is going to escape payment often pays most heavily in the end.

The two-bits we pay for *QST* couldn't begin to cover the cost of publishing it, but because the advertisers are willing to pay, it isn't a losing



Piper grasped the antenna and vaulted lightly into space

proposition. The advertisers are business men — not moralists — yet they are willing to pay. Why? Because they know that they can't get something for nothing. They want increased sales and they know they will have to pay for it. We, in turn, pay the advertisers. The more we pay them, the more they will advertise. We win. They win.

QST would be on a par with any other two-bit magazine if we only put into it two-bits plus what we pay the advertiser. Here we put our finger on beautiful opportunity. It is the privilege of the members of the A.R.R.L. to raise the value of *QST* to whatever they like by increasing the value of their contributions. Here, again, the fellow who is most willing to pay reaps the most benefit. A fellow cannot write an article for *QST* without automatically learning more than he does in reading a whole issue-full of the other fellow's stuff. If, for instance, Mr. Warner is wearing a grouch because he cannot find *two* men to take the place of Ross Hull and turns this yarn down in consequence (articles are always turned down because the editor has a grouch) I, at least, will still be the winner because of what I have been forced to learn in writing it.

My dear little Hams, if you don't like to listen to Uncle Jimmy's fairy tales, don't just tune me out — that would be wasteful — but put me off the air. The way to do that is to get into the uncle business yourselves and out-uncle me. Then everyone will profit, including Uncle Jimmy.

73, little Hams, and sleep tight; the boogers at Washington can't get you if you mind what Mamma and Papa Ham tell you. Nighty-night!

Exit Uncle Jimmy.

Cries are heard from without: "Please, Officer! Get a bigger wagon; I had to stand all the way last time!"

Photo-Electric Cells and Methods of Coupling to Vacuum Tubes

(*Continued from page 21*)

be used if they are obtainable but it is generally easier, quicker, and cheaper; even counting the additional stages required, to throw together a resistance-capacitance amplifier.

If resistance-capacitance stages are added, make the plate resistor about two or three times the plate impedance and use low plate voltage on the first few stages. The use of this low plate resistance does not give as high amplification as can be obtained with a higher value, but the frequency response and operation is much better and the use of low voltage reduces the so-called microphone noises as well. The reason the frequency response is better is due to the fact that as we decrease the plate resistance, the effective input capacity of the tube is also decreased. Do not go much below twice the plate impedance for the value of the plate resistor, however, as below this value distortion is introduced in the output circuit. Needless to state, the resistance units themselves should be non-inductive.

Fig. 7 shows a circuit with values which will give good response at extremely low frequencies — around 15 and 20 cycles — as well as at the rather high frequencies — around 10 to 12 thousand cycles — and will make an excellent starter for a television amplifier.

Fig. 8 shows a connection using a screen-grid tube for enormous gain in the medium-frequency zone.

Fig. 9 shows a circuit employing a common battery as plate and polarizing-voltage supply; while Fig. 10 shows a similar circuit suitable for relay work and the like.

Facts About Glass Arm

By Walter H. Candler*

THERE are many things which contribute to the weakening of the telegraph operator's arm. Medical authorities are pretty well agreed that the principal cause is a toxic condition of the system culminating from decayed teeth, tonsils or other infected area. These infections, frequently so insignificant they escape notice, poison the blood stream which, in turn, produces inflammation of the nerves and muscles at the weakest point. With the telegrapher, the weakest point usually is his arm.

Now, the question is: "Why is a telegrapher's arm his weakest point?" What about the arms of athletes, laborers and others, skilled and unskilled? Their arms usually become stronger with use. Perhaps Mother Nature failed to make such bounteous provision for the arm of the telegrapher. We are inclined to believe this when we consider that his arm, wrist and fingers become weaker and less responsive with continued use, rather than stronger and faster.

I am inclined to believe that the condition of the telegrapher's arm, diagnosed as vocational neuritis, which usually yields to medical treatment, is one thing, whereas the condition we operators recognize as "glass arm" is another. The symptoms, in many instances, are similar, with one ever-present exception. In true neuritis, there is inflammation; in true glass arm, there is neither inflammation nor soreness. At first, there may be sensitiveness, but this subsides and the arm gradually loses its erstwhile snap and responsiveness. Dot letters are difficult to make correctly with the usual speed. The operator becomes aware that he cannot send the fast, accurate stuff he once did; others with whom he works tell him his sending is "rotten." He tires quickly.

When this condition is caused or helped along by a seepage of pus into the blood stream from some infected area, it is accompanied by pains in the wrist, forearm, neck and back; frequently headaches, irritability and other forms of nervousness. When the condition has been cleared up by the proper medical treatment, these symptoms disappear, but the arm is ever afterward perceptibly weak; the old snap has gone out of it. Hence, you will observe that toxaemia, causing neuritis primarily, contributes, secondarily, to the condition. In other words, its after effects are manifested in "glass arm."

But, there are other causes for "glass arm," the principal ones of which are: Unnatural position of the arm in telegraphing; this retards normal circulation. Muscle and nerve strain in both writing and sending; long confinement, which lowers residual energy or body tone; undue and prolonged pressure upon the table, especially the corner of the table, with the under part of the arm, and last, but by no means of the least importance, the ever-present negative suggestion that ultimately the arm will fail.

Suggestion is a powerful factor. Young operators hear old ones complaining of the weakened condition of their arms and it is suggested to them that it's "only a matter of time" until they, too, will have "glass arm."

When a weak arm has been neglected over a long period of time, the muscles and nerves become atrophied and may develop telegrapher's paralysis. It has not been so long ago that the seat of all forms of paralysis was found to be in the brain itself; that the paralyzed member was but the result of such condition. This, I believe, is not always applicable to telegrapher's paralysis but, when found so in isolated cases, there even then remains much doubt unless the diagnostician is as familiar with psychology as he is with physiology, and is capable of differentiating between brain symptoms on one hand and mental on the other.

To go into this subject thoroughly would entail an exhaustive discussion of reflexes which limited space forbids. Suffice it to say, however, that every muscular action is in response to a mental reflex. For example: The impulse of dots, dashes and spaces is sent out by the brain. It is a mental process. The hand on the telegraph key, aided by normally functioning muscles and nerves, responds; does what the mind commands; then, by virtue of many repetitions, the conscious mind gradually places its responsibilities onto the sub-conscious mind. Habit is formed. Habit is anything that we can do without conscious thought, like writing rapidly on the typewriter, sending and receiving while actually thinking of something else.

When the sub-conscious mind sends out an impulse for six dots and the hand falters, making four dots space two dots, or five or eight dots, the conscious mind jumps in and endeavors to make the correction. Trouble ensues here which we shall not discuss now. A repetition of this conscious interference causes an unbalancing of the mental and nerve system which interrupts coordinative work. The result is that the operator puts forth more effort to make dots and dashes

(Continued on page 32)

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Indicating Instruments for Amateur Transmitters

By D. J. Angus*

INDICATING instruments are a necessary part of every radio transmitter. Without them, a transmitter cannot readily be adjusted to secure maximum output, maximum overall efficiency, or the greatest life from the tube equipment.

An understanding of the underlying principles governing the operation of indicating instruments will often enable the user to accomplish a great deal more with his instrument equipment than would otherwise be possible.

All transmitters containing tube equipment worth more than four or five dollars should be provided with a filament voltmeter connected directly across the filament terminals to enable one to operate the tube at the filament voltage recommended by the manufacturer. A relatively small increase in filament voltage shortens the filament life greatly and operating the filament at too low a voltage either results in poor operation of the transmitter or, in the case of oxide coated filaments, is liable to cause the destruction of the filament. When thoriated filaments are run too low, the thorium does not boil out to the surface quickly enough and the tube requires frequent reactivation. This also results in a shorter life than should be obtained.

The plate circuit of each tube or group of tubes making up each unit in a transmitter should be provided with a milliammeter showing the plate current. This not only makes possible holding the plate current to the value specified by the manufacturer but also provides one of the most sensitive indicators of whether the radio frequency circuits immediately connected to the tube are properly tuned.

It is usually desirable, although not absolutely necessary, to provide a radio frequency ammeter in the antenna circuit in order that any changes will immediately be noticed after the set has once been adjusted.

A high-voltage voltmeter to indicate the plate voltage is a handy instrument to have but is usually rather expensive. It serves as a check on the operation of the rectifying equipment or the generator as the case may be.

Other instruments can be installed to secure additional information or to decorate the panel but the above list covers those which most experienced operators have found necessary to secure the best results from their equipment.

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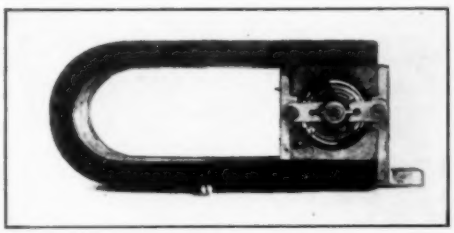
Radio instrument equipment divides itself into three general classes; namely, a.c. instruments, d.c. instruments, and radio frequency instruments. The a.c. instruments make use of the moving iron type of movement. The d.c. instruments make use of what is known as the D'Arsonval type of movement which employs a permanent magnet. The radio frequency instruments in most cases make use of a D'Arsonval type of movement operated from a thermocouple through which the radio frequency current to be measured is passed. There are a few radio frequency instruments making use of a wire heated by the radio frequency current, the expansion of which is used to move the pointer over the scale.



A VIEW OF A D'ARSONVAL MOVEMENT WHICH IS THE BASIS OF PRACTICALLY ALL D.C. INSTRUMENTS

A large U-shaped permanent magnet maintains a constant magnetic field across the space between the pole-pieces and an iron core. The pole pieces and core are accurately machined so that the moving coil which is mounted on pivots can rotate between them. The air gap is reduced to a minimum to allow the field of the permanent magnet to be as strong as possible.

MOVING IRON INSTRUMENT

Practically all of the a.c. filament voltmeters and ammeters use what is known as the moving iron type of movement. This type of movement depends for its operation on the repulsion between two pieces of iron magnetized to be of like polarity.

Fig. 1 shows in a general way the construction of the moving iron type of movement. One piece of thin iron is stationary and another is mounted on a staff in such a manner that as it recedes from the stationary piece of iron the staff is caused to rotate. The staff also carries a pointer which is moved across the scale by the motion of the moving piece of iron. This motion is opposed by a

hair spring which resists the tendency of the iron vanes to separate.

Both iron vanes are surrounded by a single coil of wire carrying the current to be measured and magnetizing both vanes, so that they are of the same polarity. In the case of the voltmeter the coil is wound of fine wire and has in series with it a fixed resistor which is adjusted so that when the full scale voltage is applied to the terminals of the instrument the current flowing is just sufficient to cause the pointer to move to the full scale position. Lower values of voltage will cause the pointer to move to intermediate points between zero and full scale depending upon the voltage across the instrument terminals.

The ammeter coil is wound with coarse wire and carries the current to be measured. Calibration is effected by changing the relative position of the coils and the vane and in some cases by an adjustable resistor connected across the terminals of the coil.

The moving iron instrument can be used on d.c. with sufficient accuracy for most uses around a transmitter. The instrument will read slightly different, depending on the direction in which the current passes through it, but an average of the two readings secured by reversing the connections to the instrument terminals represents the actual value of d.c. passed through the instrument. This difference is usually so small that it is of no material importance in a transmitter.

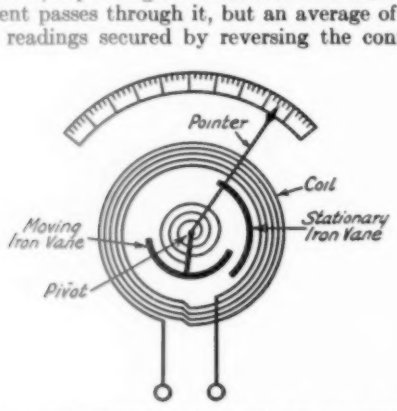


FIG. 1. — THE INTERNAL PARTS OF A "MOVING IRON" INSTRUMENT ARE INDICATED ABOVE

The coil which surrounds the iron pieces magnetizes them to the same polarity and causes them to be mutually repellent. As one piece is fixed in position, the other which carries the pointer is caused to rotate away from it against the action of the coil spring. Its final position depends upon a balance between the force of the spring and the magnetic field. Regardless of the direction of the lines of force of the magnetic field, the two pieces will always be of the same magnetic polarity and the instrument will, therefore, be suitable for either d.c. or a.c.

The torque produced by a hair spring when turned through a given angle, is proportional to that angle. The repulsion force between the iron vanes in the moving iron instrument increases at a higher rate than the current through the magnetizing coil, and in some instruments may increase nearly as the square of the current being measured. Therefore moving iron instruments have a scale which is closely spaced near the bottom and much more open near the upper end. When instruments of this type are being purchased care should be taken that their range is such that the values to be measured come in the open part of the scale rather than near the lower end where the instrument is difficult to read.

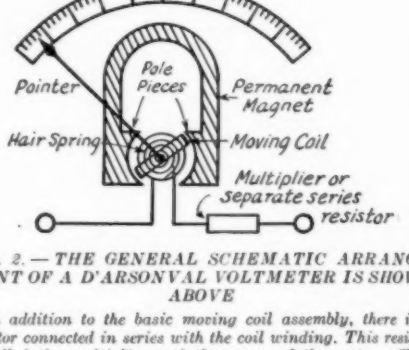


FIG. 2. — THE GENERAL SCHEMATIC ARRANGEMENT OF A D'ARSONVAL VOLTMETER IS SHOWN ABOVE

In addition to the basic moving coil assembly, there is a resistor connected in series with the coil winding. This resistor is called the multiplier and the range of the meter will be dependent upon its value. Its resistance is usually quite high and in high-voltage meters it is mounted in a separate box and must be connected in series with the meter when it is put in service.

D'ARSONVAL INSTRUMENTS

Practically all of the d.c. voltmeters, milliammeters, and ammeters used around a radio transmitter operate on the D'Arsonval principle. An example of the D'Arsonval type of movement is illustrated in the first photo.

The D'Arsonval movement depends for its operation on the force causing a conductor carrying current to travel across a magnetic field in which it is placed. The movement, as may be seen in the second photo, consists of a square coil of wire carried by a pair of pivots so located that the coil is free to turn in the magnetic field between the poles of a permanent magnet. The coil carries a pointer moving across the instrument scale, and a pair of hair springs which restrains its movement and returns the pointer to zero when no current is flowing through the coil.

Current passing through the pivoted coil causes it to tend to rotate, rotation being opposed by the hair springs. The torque produced by the current is proportional to the current flowing through the coil while the counter torque produced by the hair springs is proportional to the angle through which the coil is turned. Therefore the angular displacement of the coil is proportional to the amount of current flowing through the coil and the pointer will move a distance proportional to the current or voltage being

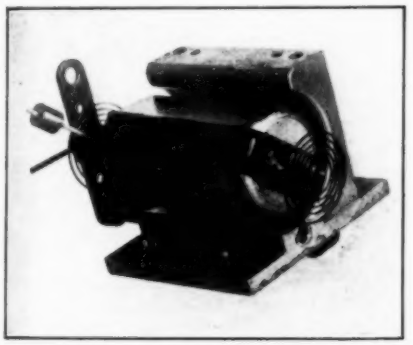
measured. The instrument will, therefore, have an evenly divided scale.

Current is led into the moving coil through the same hair springs that are used to control the position of the pointer. A stationary block of iron is mounted inside of the moving coil in order to cut down the reluctance of the magnetic circuit and enable a relatively small magnet to produce the necessary flux. This iron is so shaped that the field strength in the air gap through which the coil moves is uniform, insuring that the instrument will have a uniform scale.

D'Arsonval voltmeters as shown in Fig. 2 have a high resistance connected in series with the moving coil. Its value is adjusted so that at full scale voltage an amount of current flows that will just bring the pointer to the full scale position. At any intermediate voltage, the pointer will take up a corresponding position.

Instruments of this type require between 5 and 20 milliamperes, usually averaging around 15 milliamperes, for full scale deflection of the pointer.

When the full scale voltage is 150 volts or lower the series resistor is usually placed inside the instrument case or mounted directly on its back. Where the voltage exceeds this value it is usual practice to supply a separate resistance box which must be connected in series with the instrument. Generally speaking, it is not good practice to dissipate more than 1½ watts inside of the case of an instrument because of the resultant heating effect. This limitation prevents placing the series resistor of the higher voltage meters inside the case.



A MORE DETAILED VIEW OF THE MOVING COIL, POLE-PIECE, HAIR-SPRING AND IRON CORE MAY BE SEEN HERE

The permanent magnet and one pole-piece have been removed. The iron core is fastened to the plate of non-magnetic material to which the pole-piece is mounted and is located in such a position as not to interfere with the motion of the coil over the useful range of rotation. At the center of the hair spring may be seen the pivot upon which the coil rotates. At the left end of the coil may be seen a short rod with a weight mounted upon it. This is to counterbalance the weight of the pointer and make the position of the pointer independent of the angle at which the meter is held.

The D'Arsonval d.c. ammeter and milliammeter is illustrated in Fig. 3. This type of instrument contains a relatively low resistance strip, or shunt, through which the current to be measured is passed. The terminals or the moving coil are connected across this resistor, so that the voltage drop caused by the current passing through this resistor is applied to the moving coil. It is obvious that the ammeter is essentially a voltmeter, having a very low range, and measuring the voltage drop across a resistor carrying the current to be measured.

The only difference between an ammeter and a milliammeter is in the size of the shunt employed. The movements are usually designed to come to full scale at between 50 and 100 millivolts.

RADIO FREQUENCY INSTRUMENTS

All instruments for measuring radio frequency current depend for their operation on the heating effects of the radio frequency current being measured.

The thermal expansion instrument contains a fine wire through which the current is passed. The expansion of the wire due to its heating is measured by a pointer, the position of which is controlled by the length of the wire. This type of instrument is relatively slow in its operation and has been largely superseded by instruments operating on the thermal-electric principle.

When two dissimilar metals are joined together and the junction heated, a voltage is generated which is proportional to the difference in temperature between the heated junction and the other ends of the wires. Figs. 4 and 5 show two methods of using this principle in connection with a D'Arsonval movement to measure radio frequency current.

The construction shown in Fig. 4 is employed where the amount of current to be measured is relatively small, usually not to exceed one half ampere. Two small wires of dissimilar metals are electrically welded together at the center. The radio frequency current to be measured passes in through one wire and out through the other, heating the wires and the junction. The remaining ends of the wires are connected through a calibrating resistor to the terminals of the moving coil of the instrument. The heating effect of the radio frequency current passing through the dissimilar wires causes a direct current voltage to be generated, which in turn results in a flow of direct current through the instrument moving coil circuit as shown in the illustration.

The heating effect is proportional to the square of the radio frequency current being measured whereas the voltage generated across the junction is proportional to the temperature. Therefore, the motion of the pointer over the scale will increase approximately proportionally to the square of the radio frequency current passed

through the thermo-couple. Because of these factors the instrument has a scale which is crowded at the lower end and open at the upper end. This makes it necessary to purchase instruments of such a capacity that the average current to be measured will be in the open part of the scale. Radio frequency ammeters of this type are not especially accurate below a quarter of the full scale capacity because the divisions are crowded at the lower ends.

Where the radio frequency current to be measured exceeds approximately one half ampere, it is customary to use two dissimilar wires connected in parallel as far as the radio frequency is concerned, but connected in series as far as the thermal-electric effect is concerned. This system of connections is shown in Fig. 5. It will be noted that the voltage produced at the junction "A" is in the same direction as the voltage produced by junction "B" and they are in series so far as the d.c. path is concerned. This results in not only a higher thermal-electric voltage but also much greater current carrying capacity.

Most thermo-couple instruments are designed for a d.c. voltage across the moving coil at full scale of between 15 and 25 millivolts. In all cases they are calibrated by adjusting a small calibrating resistor connected in series with the moving coil.

GENERAL

It is rare for one to have trouble with the moving iron type of instrument since the forces on the parts are relatively light, and there are no moving conductors. In addition to this the moving iron instruments are not so likely to be abused since they are usually employed as filament voltmeters and it is rare that sufficient voltage is applied to the filament circuit to damage the instrument.

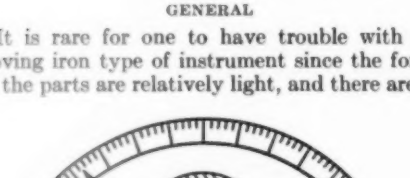


FIG. 3. — THIS SHOWS THE METHOD BY WHICH THE D'ARSONVAL MOVEMENT IS APPLIED TO THE MEASUREMENT OF CURRENT

A piece of resistance wire is connected across the terminals of the moving coil and the current to be measured passes through it. The voltage drop across the shunt is applied to the moving coil and causes a flow of current through it with its resultant movement of the coil assembly and pointer.

D'Arsonval voltmeters sometimes cause trouble due to open circuits in the multiplier or series resistor. These resistors are wound of the finest resistance wire to be had and are easily damaged by mechanical abuse or by allowing the multiplier to get wet. If the multiplier is made up of sections, the open section can usually be found and bridged without the necessity of sending the instrument back to the manufacturer. Tests for open circuits should be made with a 6-volt battery connected in series with a telephone receiver. Any other method of testing is liable to result in a current through the moving coil sufficient to damage the instrument. Also the resistance of the series multiplier is usually so high that opens can only be found by means of a relatively sensitive test circuit.

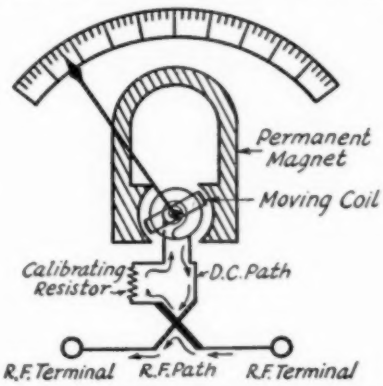


FIG. 4. — WHEN THE AMOUNT OF RADIO FREQUENCY CURRENT TO BE MEASURED IS SMALL, A SINGLE THERMO-COUPLE IS EMPLOYED

The radio frequency currents pass through the junction of the two dissimilar metals and generate heat which in turn generates a small d.c. potential across the junction. This d.c. passes through the D'Arsonval movement and actuates the moving coil to which the pointer is attached. A resistor in series with the moving coil allows the meter to be calibrated without necessitating adjustment of the thermo-couple or moving coil.

Milliammeters are often damaged by the user by accidentally connecting them across a low voltage source that has insufficient resistance to limit the current to a value below that which will burn out the milliammeter. An ordinary dry cell will destroy a milliammeter or millivoltmeter almost instantly. The damage done may consist of simply bending the pointer but more often consists of tangling or burning off the hair springs, overheating the moving coil, or damaging the pivots.

A bent pointer can be straightened by holding the pointer near the pivot attachment with one pair of tweezers, and straightening it with another pair. Do not try to hold only the moving coil when bending the pointer as this will, in many cases, loosen the attachment between the pointer and the coil system.

Tangled hair springs can usually be straightened by the use of tweezers. If the springs have been overheated, it will be necessary to install new ones. This can best be done by the manufacturer, since he has springs in stock that have

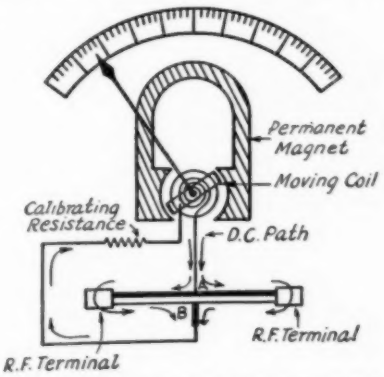


FIG. 5. — FOR HIGHER CURRENTS THE SIMPLE TYPE OF COUPLE IS NOT USED

In this case, the radio frequency current flows through two wires or strips in parallel. In the drawing, the heavy line represents one type of metal and the thin line another. The junctions at which the d.c. is generated are at the middle of the wires and are labeled A and B. As far as the moving coil system is concerned, these are in series and the voltages generated aid each other because they are of the correct polarity. As in Fig. 4, a calibration resistor is provided.

the proper characteristics, and also has the special tools used in assembling the springs on the moving coil.

If the user has occasion to install his own hair springs, he will find that the best soldering iron to use is one made up of a piece of No. 8 copper wire sharpened to a fairly fine point. The tweezers used in holding the hair spring can be made by taking an ordinary pair of tweezers and grinding them to a fine point. When soldering the hair spring in place, do not heat the body of the spring, but only the ends where the attachment is to be made. Use rosin, or some other noncorrosive soldering paste as a flux.

The usual difficulty encountered with thermo-couple radio frequency instruments is that of burning up the thermo-couples by current overload. This seldom results in any damage being done to the movement and the trouble can be corrected simply by replacing the damaged thermo-couple with a new one. Most manufacturers of instruments of this type will sell the thermo-couples separately so that the customer can make his own replacements.

When replacing the thermo-couples, it will usually be necessary to adjust the resistor connected in series with the moving coil in order to bring the instrument to calibration. Calibration can be made with 60-cycle current as the reading of the instrument is the same on radio frequencies as it is at 60 cycles.

The capacity of thermo-couple instruments can be changed by soldering a shunt made of a short piece of copper wire across the thermo-couple lugs. If it is necessary to double the capacity of the instrument, the instrument should be brought to full scale by means of 60-cycle a.c. A shunt should then be soldered between the brass block carrying the thermo-couples, and adjusted so that the instrument reads one half the full scale value. The current passing through the instrument then will be represented by the reading of the instrument multiplied by 2.

Shunts on radio frequency instruments always should be as short as possible, and placed parallel and close to the thermo-couple. If they are placed outside the instrument case, the instrument will not read exactly the same on radio frequencies as it does on 60 cycles.

Do not attempt to increase the capacity of a radio frequency ammeter to any extent by increasing the resistance in series with the moving coil since this simply results in overloading the thermo-couple and probably will lead to its ultimate destruction.

A milliammeter can be used as a voltmeter by using it to measure the current caused to flow through a known resistance by the voltage to be measured. For instance, a 100-milliampere milliammeter can be used as a 1000-volt voltmeter by connecting in series with the instrument a fixed resistance of 10,000 ohms. The instrument would draw 100 milliamperes at full scale which would be an objection if it were to be left continuously in the circuit but will serve for short tests.

The range of any of the voltmeters can be changed simply by changing the resistance of the series multiplier. The full scale capacity of a voltmeter is proportional to the total resistance of the multiplier and movement. Therefore if one desires to double the capacity of a voltmeter it is only necessary to double the total resistance, which means connecting in series with the instrument another resistor equal to that of the instrument and multiplier.

For most radio work, the enameled resistors used as grid leaks make satisfactory series resistors for increasing the range of voltmeters or for measuring voltage by means of milliammeters. These resistors will dissipate anywhere from 30 to 100 watts, depending on the size. If necessary, two or more can be connected in series for the higher ranges.

Stickiness of an instrument pointer or sluggishness in reaching either zero or the value to be measured, is caused by dirt in the space in which the coil or moving vane rotates or is due to dull or broken pivots. The dirt can be removed by blowing through the air gap or by means of a small piece of paper. The pivots can be sharpened by whetting them with a small piece of Arkansas oilstone. However, it is usually best to send the

instruments back to the manufacturer in case the pivots are damaged.

Generally speaking, the instrument used in radio transmitters gives less trouble and more real service than any other part of the equipment. They are cheap enough so one doesn't have to make them himself and a little money invested in good instruments always pays.

Facts About Glass Arm

(*Continued from page 26*)

correctly. This is a strain, and the "upset" or "nervous" operator soon is working against himself, like one trying to swim up a swift stream.

While telegraphing, the arm is in an unnatural position. The blood cannot circulate freely to the extremities as if it were being used in swinging motion. Pressure on the table not only retards circulation but interferes with nerve functioning. The muscle and nerve tissues become impoverished and their vigor and elasticity diminish. Capillary circulation becomes weak and in advanced cases ceases altogether. The hand usually is cold, clammy, and while there may be no pain to speak of, the victim is aware of an uncomfortable feeling from the tips of his fingers to his elbows.

Now, the question of a remedy arises. Will exercises help?

If the condition is true neuritis, and only a capable physician can determine this, exercises of any kind will do more harm than good. Exercises should not be taken until the cause has been cleared up; then, certain exercises will help to build and develop the small muscles of the arm which in time, if followed properly under the direction of a physician or one who understands the condition, will restore it to its normal state where it will respond readily to the mental impulse. It must be understood, however, that just any kind of exercise will likely do more harm than good. As with medicine so with exercise: "What will cure one will kill another."

I have had occasion to interview many celebrated musicians, artists, and others doing work that necessitated the free, easy action of their hands, arms and fingers. In every instance I found that the "right kind" of exercise constituted part of their daily routine.

How necessary, then, are corrective exercises for developing the telegrapher's arm? He needs certain exercises to promote free circulation to his finger tips, to rebuild broken down cell tissues and carry off the dead cells. He needs other forms of special exercises to develop the small muscles as they should be developed in a telegrapher's arm — not like those of a blacksmith, laborer or strong man — to promote uniformity, rhythm, normality, speed, and accuracy.

A muscle-bound arm cannot send on a telegraph key. Many cases of so-called cramps of various forms verging on paralysis in some instances, are muscle-bound conditions brought on by the wrong kind of exercises. I say positively, and any physician will bear me out, that indiscriminate exercising frequently does irreparable harm. The antiquated methods of certain well-advertised physical culturists may give a telegrapher large, beefy arms that are useless for sending or writing.

The wrestler and boxer need different systems of exercises. The ball player, sprinter, distance swimmer, walker and tennis player — all, must take specific exercises to develop certain muscles in the right proportion to meet their requirements in muscular control and reflex coördination necessary to skill and perfection. The champion wrestler of the world would be helpless in the prize ring with a Jack Dempsey. He has great, bulging muscles, it is true, but they have been trained to pull, tug, twist and hug — not to strike a blow; and what would Dempsey do in a tennis court pitted against a Tilden or Wills? He could hit the ball with greater force than either, but they soon would easily defeat him because their muscles have been not only properly developed, but trained to coördinate in playing the game. Their minds, muscles and nerves function together.

That the mind and its proper functioning plays the most important part in telegraphing, no one can question; hence it is quite obvious that many cases of glass arm can be traced to improper methods and a lack of mental and muscular coördination.

At another time I shall discuss this phase of the subject and pass along the benefits of my experience in handling many thousands of cases during the past eighteen years.

Re: An Improved Super-Heterodyne

By J. M. Grigg*

THE article, "An Improved Super-Heterodyne," which appeared in the December issue of *QST* described a circuit in which a flaw has since come to light. In this discovery it was revealed that the circuit as shown is not satisfactory if separate tuning controls are used. The reason is that the loop circuit, in series with the grid coil, offers enough impedance to stop oscillation if it gets into resonance with the oscillator circuit, thus causing an objectionable click.

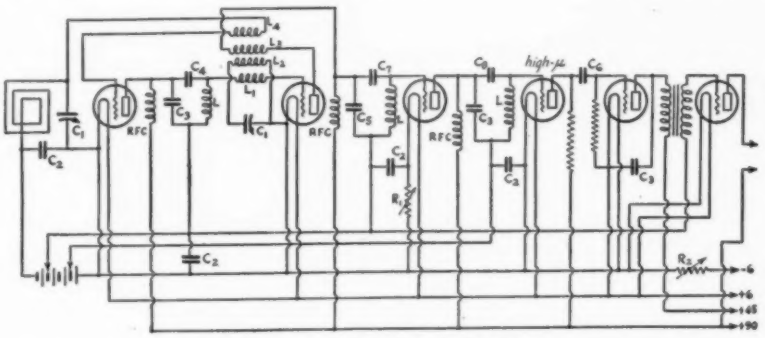


FIG. 1. — THE REVISED CIRCUIT

The first detector no longer is the oscillator but that function has been transferred to the first intermediate frequency amplifier tube. The third and fourth tubes are adjusted as detectors and no means is provided for regeneration. The constants are:

C1 — 350 μμfd. variable.
C2 — 5,000 μμfd. fixed.
C3 — 2,000 μμfd. fixed.
C4 — 1,000 μμfd. fixed.
C5 — 1,500 μμfd. fixed.
C6 — 250 μμfd. fixed.
C7 — Approximately 1,250 μμfd. This circuit must tune to the same frequency as does L, C3, C4.
C8 — Approximately 1,000 μμfd. This circuit also must resonate with L, C3, C4.
L — 63 turns of No. 24 d.c.c. wire on a 3-inch form or a 75-turn duolateral coil may be employed.
L1, L2, L3 and L4 are specified in Fig. 2.
R1 — 25 ohms. Used as volume control.
R2 — 3 ohms.

In the arrangement shown herewith (Fig. 1) the difficulty has been nicely overcome with the elimination, as well, of whatever disadvantage might accrue from stray coupling between tuned circuits. A circuit of this nature, only less elaborate in form, did satisfactory service in low-frequency supers over an extended period; in the application to high frequency amplifiers, however, there is one pitfall that must be pointed out. If lower-beat tuning is used, the oscillations will foul with the amplifier frequency at one point but this, of course, must happen even with a separate oscillator. For the case in mind where the intermediate frequency amounts to several hundred kilocycles and upper-beat tuning to escape interference is the intention, this fouling of frequencies cannot occur, and there is all the utility and flexibility of a separate oscillator. Separate tuning controls may be used, this in the average case amounting to a requirement as single control for a high-beat super is a feat of engineering.

The only change in the oscillator coupler is the addition of a 30-turn pick-up coil inside the tubing, with no change of grid biasing or plate voltages. Excepting for the connecting in of the pick-up coil, the only change in wiring is the transfer of the plate and grid coils to the second tube circuits. The seat of oscillations goes with the transfer but the additional load on the biased tube is insufficient to cause distortion or voltage loss. Grid rectification may be used if desired but no doubt, the loss in selectivity will offset the gain in signal strength.

Another change in the original circuit is the substitution of an additional rectifier tube in the place of regeneration, an arrangement that has also been proved in other circuits. Used in this manner, the additional tube gives the equivalent or better, of another stage of amplification. Although a 201-A will serve as a makeshift, a high-mu tube is preferred, owing to the required resistance coupling. For the resistors, ordinary grid leaks suffice very well. Plenty of high-quality

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energy will be passed before overloading occurs, nevertheless, overloading occurs on ordinarily

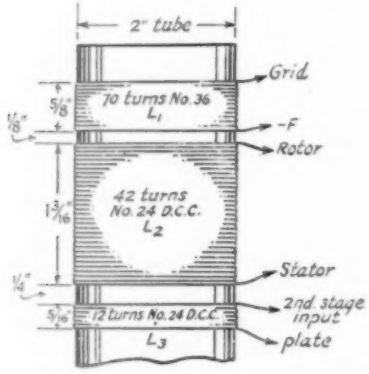


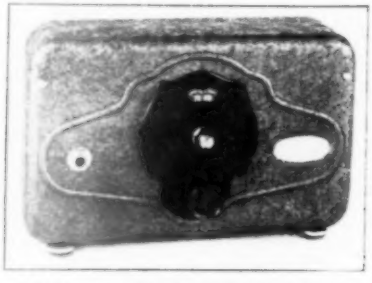
FIG. 2.—THE DIMENSIONS OF THE OSCILLATOR COUPLER

L1 is not shown because it consists of 30 turns inside the tube near L2. All windings are in the same direction.

strong signals: for this reason a volume control ahead of the detector is imperative.

A New Monitor

AN outstanding contribution of radio manufacturers to 1929 amateur station equipment is the new Aero monitor. Its design and construction show a thorough understanding of the requirements to be met not only as to operation but also as to mechanical features and "dress."



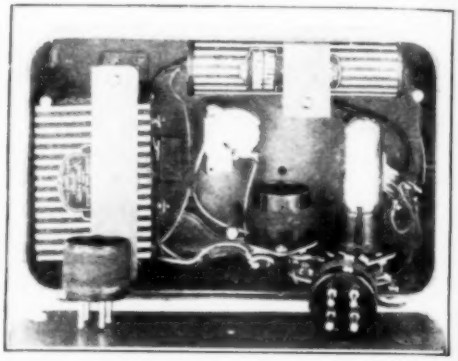
FRONT VIEW OF THE MONITOR

The filament control phone jack is to the left of the dial.

The monitor is a completely shielded unit, the metal case being finished in crystal black. Both "A" and "B" batteries are contained within the case, the "B" battery being of the small 22½-volt size while the "A" battery is a two cell affair of the large flashlight type. Both batteries are clamped in place and are removable. Access to the inside of the shield is gained by removing the back plate which is held in place by three nuts.

A '99 type tube is used, the switch for its filament supply being incorporated in the filament control phone jack. Inductances of the tube-base type are provided for the 3500-, 7000- and 14,000-kc. bands. Adequate coverage of the three bands is obtained and the circuit is such that smooth oscillation without squealing is obtained over the full frequency range of each coil.

In operation under usual station conditions a QSA5 signal is obtainable when monitoring the signal emitted by the transmitter. The device is



REAR VIEW WITH THE BACK COVER-PLATE REMOVED

also applicable to frequency checking as a calibrated oscillator or as an oscillator in conjunction with a frequency meter as described in the article "The Frequency Measurement Problem," October, 1928, *QST*.

—*J. J. L.*

Atlantic Division Convention

June 21st and 22nd at Philadelphia, Pa.

THE Third Annual Atlantic Division Convention will be held in Philadelphia, Pa., June 21st and 22nd, under the auspices of the Philadelphia Radio Association. The Hotel Walton, centrally located, has been chosen for the convention activities. It is the intention of the convention committee to make the convention days sparkle with originality and new ideas, but the age-old traditions of ham conventions will be carried out also, with technical talks, trips, stunts, etc., that will amaze and delight even the dyed-in-the-wool delegate.

The reception committee will be ready and anxious to serve every one and see that those who come are housed properly according to the size of their pocketbook.

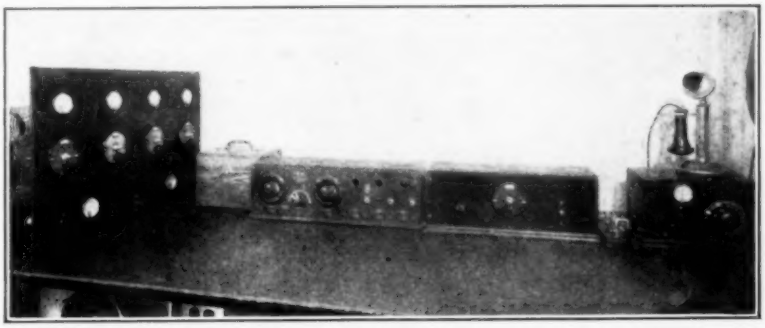
The convention tickets will be $5.00 each. Earl McCullough, Financial Secretary, 36 No. 56th St., Philadelphia, Pa., will appreciate hearing from those who intend to be present.

W8BQ

This is the second published entry in the Station Description Contest detailed in the March issue of QST. *The station description considered the best of those on hand will be published in each succeeding issue during 1929.* — EDITOR.

THE ancestor of W8BQ, owned and operated by H. M. Walleze at 997 North James St., Hazleton, Pa., was born back in 1912. The bug had stung hard and a "two-bit" galena detector and two-slide tuner got NAA — when the galena was in the mood. A motor-boat ignition coil was salvaged, after several hours' diving, from the bottom of the Erie Canal where its owner had been seen to accidentally drop it one day. Thus the first transmitter was obtained. It finally grew to a husky 1-kw. spark whose near-synk note was widely known. So much for the "apple-sauce age," gone but not forgotten.

The spark was dethroned by a 5 watter in 1922. Stocks gradually went up to a 250-watt bottle and then settled back to the present 50 watter, crystal controlled.



THE NEAT AND CONVENIENT ARRANGEMENT OF STATION EQUIPMENT

The transmitter is at the extreme left. Next in order are the frequency meter in its case, the low frequency receiver, high frequency traffic tuner, Vibroplex and monitor. The generator field rheostat and switch are at the lower left.

THE TRANSMITTER

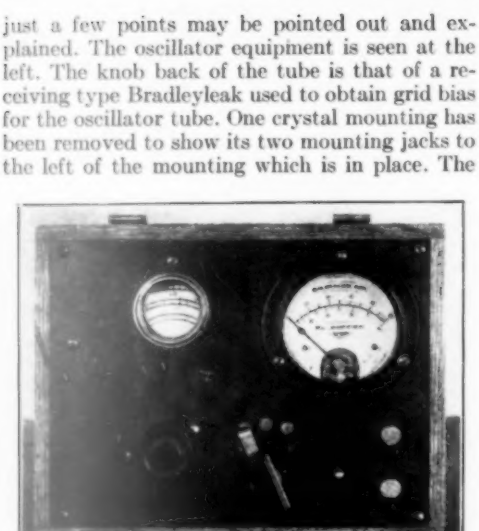
The transmitter proper is completely contained in one unit and was built with the idea of semi-portability; not that there is any desire to carry it around but in event of a move, a 5-ton Mack is not called for. All of the important controls, or rather those most used, are on the panel where they may be easily reached without danger of a "ram." The panel is of bakelite, 30 inches long by 20 inches high and the over-all depth of the transmitter is 14 inches. A glass enclosure is normally in place to keep out dust.

Referring to the photograph of the transmitter, from right to left the Weston type 301 and 425 meters are as follows: 3-ampere oscillator tank radio frequency ammeter; 100-milliampere oscillator plate current milliammeter; 300-milliampere amplifier plate current milliammeter, and 3-ampere antenna current ammeter. Also from right to left, the Marco dials control the variable condensers as follows: Oscillator tank; neutralizing; amplifier tank, and antenna series. The 5-ma. Weston milliammeter at the lower right is used with an Electrad 75-watt, 100,000-ohm resistor in series to make up a 500-volt d.c. voltmeter for the oscillator plate supply. The knob to its right controls a Bradleyleak type E-210, 0–30,000 ohms, used for fine adjustment of oscillator plate voltage.

Directly above the 500-volt meter is the knob controlling the crystal selector switch to be explained later. The cam switch in the center is used to throw the Weston 15-volt a.c. meter, on the left, to either the 10-volt or 7.5-volt filament circuit. The knob to the left of this meter is that of the Bradleystat in the primary of the filament transformer and is used for fine adjustment of filament voltage. Directly above the cam switch is the knob of the Bradleyohm E (taken from a B substitute) used for obtaining grid bias for the amplifier. Theoretically this may be a poor method of obtaining bias but, considering all things, in practice it is very much superior to batteries, especially where variations are in steps of 22½ volts per block.

Referring to the rear view of the transmitter, the equipment immediately identifies itself but

just a few points may be pointed out and explained. The oscillator equipment is seen at the left. The knob back of the tube is that of a receiving type Bradleyleak used to obtain grid bias for the oscillator tube. One crystal mounting has been removed to show its two mounting jacks to the left of the mounting which is in place. The



THE FREQUENCY METER WITH ITS COVER REMOVED

amplifier plate radio frequency choke is next to the National tank condenser while the large fixed condenser to the left of the R.E.L. inductance is the amplifier by-pass condenser. Someone may throw up his hands in horror at the placement of the tank condenser, by-pass condenser and tube with relation to the field of the amplifier inductance and at the lack of shielding in such close quarters. Actually, quite a little study and experiment was given to placing the inductance where it is and no ill effects have been noticed, the losses in this case being insignificant. Not the slightest difficulty is encountered in neutralizing the amplifier or is had from feed-back.

The shelf is of bakelite, 29 inches long by 8 inches wide and is mounted 2½ inches back of the panel. The switch for cutting out the neutralizing condenser when doubling frequency is just to the left of the 50 watter. The pancake antenna coupling coil is mounted on a brass rod so that coupling may be easily and correctly adjusted.

Practically everything on the base-board is easily identified. The filament heating transformer is home-made and huskily built. Three secondary windings have been provided, two 7.5 volt and one 10 volt. One of the 7.5-volt windings is not in use. By looking closely it can be seen that the Electrad resistor used as a multiplier on the 500-volt meter is mounted directly under the big Ward-Leonard resistor on the left by means of a rod through the lower part of the original Ward-Leonard mounting. Above this, on the under side of the shelf, is the Faradon amplifier feed condenser and to the left of that the oscillator plate radio-frequency choke. It is noticeable that the two chokes to be seen are a little unusual in appearance and they will therefore be explained in detail — for they are unusual.

It is common knowledge that radio frequency has little love for resistance. Since we want to keep the radio frequency current out of the grid return and high voltage source, a simple way to do this is to introduce some resistance in wire form. Therefore, a hard rubber rod of 1-inch diameter was cut in ⅝-inch lengths and two 1/16-inch slots were cut in each length, the slots being ⅛ inch apart. One slot was wound full of No. 28 s.s.c. resistance wire and the other full of No. 28 s.s.c. copper wire, both windings being in the same direction and connected in series. There are approximately 200 turns in each slot. As connected in circuit, the resistance wire goes to the grid when the choke is used in the grid circuit and to the inductance when used in the plate circuit, the copper wire winding being at the low potential radio frequency end. These proved very much superior to other chokes tried (with the possible exception of tuned chokes which are more or less fussy) and are so universally satisfactory that there is no need to use plug-in chokes for the various bands.

The idea of not using a grid choke in the crystal oscillator grid circuit has been found to be very poor practice. A choke is just as essential there as in any other grid circuit. However, be sure that its natural frequency falls well below that of the crystal. An extra large number of turns is preferable to too few or none at all! Immediately in front of the filament transformer can be seen one of the two chokes used in the keying system.

The crystal selector switch is simply a s.p.d.t. switch connected as shown in the circuit diagram and permits the use of either one of the two crystals plugged in while the plug-in mountings permit the use of any two of the crystals available to make up the combination. For ease in wave shifting, a chart with all the adjustments for each of the various frequencies thereon is posted near the set and each crystal mounting is plainly stamped with its individual frequency. This makes a very simple and effective set-up and allows a positive and rapid frequency shift. An average of 30 seconds is required for a change to any one of the available frequencies. All crystals could be mounted and connected to additional switch points but this was not considered necessary. The commotion is just about as bad on one frequency as another anyway!

The shiny bus wiring is of No. 10 hard drawn solid tinned copper. There is no gain in using High-C combinations in a crystal controlled rig. In fact, the tank tuning condensers could just as well be eliminated except for ease of tuning. For this reason there is no call for heavier bus and the No. 10 is rigid and easy to work. All low-tension wiring is run through grounded copper tubing. The core of the filament heating transformer is also grounded.

Operation is about as usual for crystal controlled transmitters of this type with the possible exception of the oscillator. Instead of sweating the crystal with 450 volts on the plate of the oscillator tube and then running the amplifier excitation tap down below the plate end to obtain the correct excitation, this tap is taken right off the plate end of the oscillator inductance and the plate voltage on the oscillator tube is reduced until correct excitation is obtained. The safety factor is greater with this method of obtaining amplifier excitation control, the efficiency of the oscillator is increased and overall operation compares favorably with that obtained with the "tapping" method.

MONITOR AND POWER CONTROL

At the extreme right of the station photograph is the monitor — with the house telephone aboard it. The monitor is in reality more than just a monitor for incorporated within the same cabinet is the transmitter power control. The National V. V. dial belongs to the monitoring end which is a simple oscillating detector of the type of the many recently described in *QST*. The Weston type 354 8-volt d.c. meter is on the station storage battery. Throwing the cam switch up cuts this meter in for readings. Throwing the same switch down lights the filament of the monitor tube, energizes the starting relay which in turn puts the filament and plate supply of the transmitter into action, and lights the pilot light. Thus the monitor is always in action while transmitting and is made exceptionally effective by the ingenious method of coupling its output to the same headsets as are used on the receiver. Details of the coupling arrangement are given in the Experimenters' Section of *QST*, February and March, 1929.

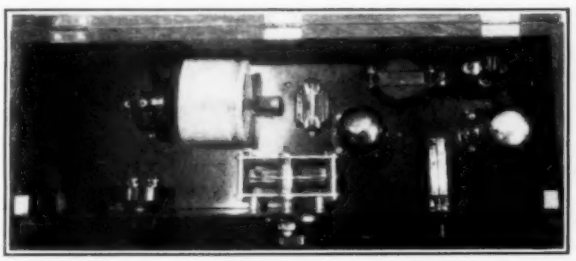
Next to the monitor in the photograph is the "bug," equipped with proper weights to hold it down to 30 words per minute at top speed and capable of working smoothly at 5 words per minute if necessary. The "bug" keys a relay connected in the center-tap of the filament transformer of the power amplifier, both the relay and key being equipped with condensers and resistors in series to prevent sparking and resultant clicks.

FREQUENCY METER AND RECEIVERS

The frequency meter is so constructed that it covers the 14,000-kc., 7000-kc. and 3500-kc. bands, respectively. It was originally built some time back in the days of wave-meters and it is perhaps not exactly correct to refer to it as a frequency meter, although it serves its purpose just as well. The three-point switch serves to vary the inductance to give proper coverage of each of the three bands. No good reason was seen for using a trunk full of plug-in coils and the tapped inductance method has been entirely satisfactory for its intended use. A Jewell current-squared galvanometer serves as a resonance indicator and the dial is calibrated directly in meters from a General Radio 224L Precision Wavemeter. Calibration is checked against the Precision meter at frequent intervals and has held very well so far.

The high-frequency receiver is modeled after the Westman traffic tuner, the L/C ratio being so proportioned that each coil just covers its amateur band. The cam switch on the panel puts the receiver into operation in the down position while in the up position it starts the transmitter and monitor in case break-in is not being used.

A feature of the coils is the use of tickler windings of few turns, large diameter and closely coupled to the secondary windings. The regeneration control does not effect tuning. A 112-A tube is used as a detector with a large grid condenser (approximately .001 μfd.) since, within reason, the larger the better, for signal strength. No sound reason was seen for using a condenser of .0000001 μfd.! The large condenser may broaden the tuning a bit — but very little if the rest of the circuit is correctly designed. This station being primarily a relay station, no necessity has been found for r.f. amplification.



A PEEK INTO THE HIGH FREQUENCY TRAFFIC TUNER

The low-frequency (or long wave, if you will) receiver is a Grebe CR-9 covering from 150 to 3000 meters and is used for recreation on commercial waves. Many interesting things still happen "up" there and a big kick may be had cruising around on these bands and occasionally hearing an old friend of days at sea. When the B.C. stations flop for an SOS, a dash is made for the Grebe which proceeds to work overtime on such occasions.

A Jones cable permits quick change of the common A- and B-supply to either receiver. The A-supply consists of an Exide 200-a.h. storage battery with trickle charger and the B-supply of a homemade eliminator. Where the idea that a B-substitute was N.G. as plate supply for a high-frequency receiver originated does not matter — this one works. A 100-volt Edison B storage battery is kept fully charged as a precaution against a.c. failure, but this is rarely needed.

POWER SUPPLY AND ANTENNAS

The plate power supply consists of a 1000-volt, 250-watt, 3600-r.p.m. Westinghouse generator directly connected to the motor energized from the 120-volt a.c. line and a modified Thordarson power pack delivering 400 volts d.c. The high-voltage generator is normally used to supply plate power to the 50-watt amplifier only, but in event of failure on the part of the 400-volt rectifier supplying the crystal oscillator, plate power to the latter may be supplied from the generator through a Ward-Leonard 20,000-ohm resistor, the change being made by simply throwing the switch provided for the purpose.

The motor-generator unit is housed in a tin-lined box as shown in the photograph of the unit. The lining, machine frame and negative high voltage are grounded to eliminate "hash." Two stacks of paper towels beneath the base absorb mechanical vibration — or rather blot it out! The small radio frequency choke mounted above the

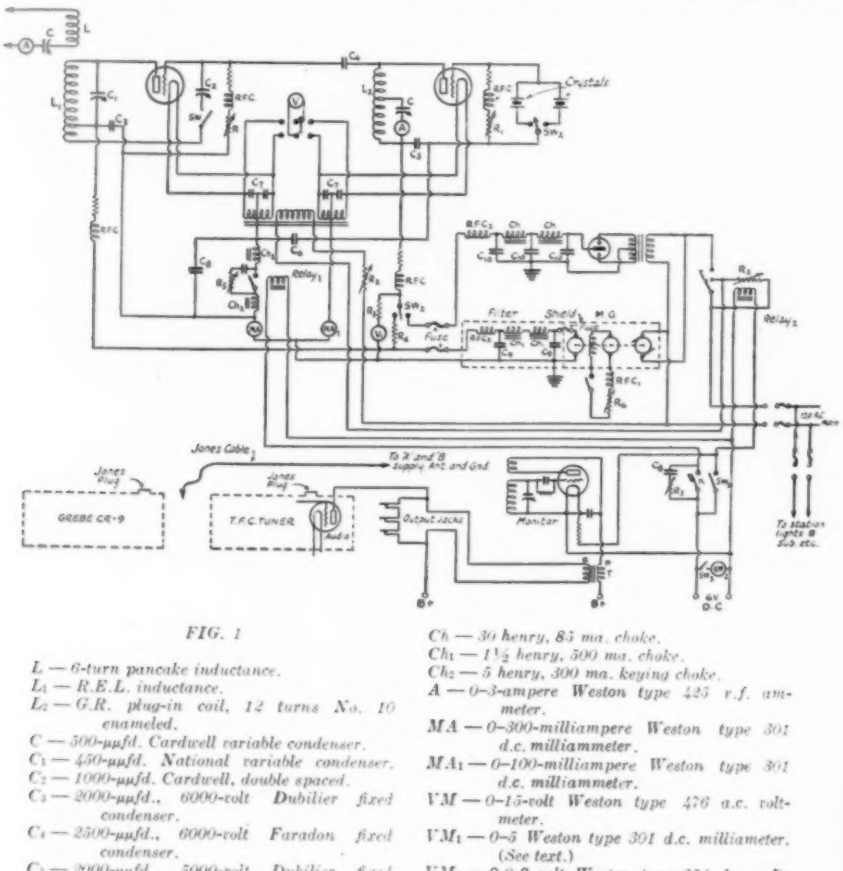


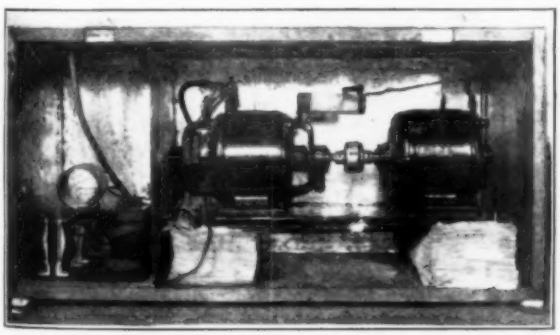
FIG. 1

L — 6-turn pancake inductance.
L_1 — R.E.L. inductance.
L_2 — G.R. plug-in coil, 12 turns No. 10 enameled.
C — 500-μμfd. Cardwell variable condenser.
C_1 — 450-μμfd. National variable condenser.
C_2 — 1000-μμfd. Cardwell, double spaced.
C_3 — 2000-μμfd., 6000-volt Dubilier fixed condenser.
C_4 — 2500-μμfd., 6000-volt Faradon fixed condenser.
C_5 — 2000-μμfd., 5000-volt Dubilier fixed condenser.
C_6 — .25-μfd., 1000-volt by-pass condenser.
C_7 — Same as C_6.
C_8 — .5-μfd., 1000-volt by-pass.
C_9 — 1-μfd., 1750-volt filter condenser.
C_{10} — 2-μfd., 600-volt filter condenser.
R — 0–30,000 ohm Type E Bradleyleak.
R_1 — Type E Bradleyohm. (See text.)
R_2 — 0–100-ohm Type E-210 Bradleystat.
R_3 — 100,000-ohm Electrad resistor.
R_4 — 20,000-ohm Ward-Leonard resistor.
R_5 — 0–400-ohm potentiometer.
R_6 — 0–200-ohm Ward-Leonard field rheostat.
RFC — See text.
RFC_1 — 100 turns No. 24 d.c.c. 1½" diameter.
RFC_2 — 300 turns No. 28 d.c.c. 3" diameter.
Ch — 30 henry, 85 ma. choke.
Ch_1 — 1½ henry, 500 ma. choke.
Ch_2 — 5 henry, 300 ma. keying choke.
A — 0–3-ampere Weston type 425 r.f. ammeter.
MA — 0–300-milliampere Weston type 301 d.c. milliammeter.
MA_1 — 0–100-milliampere Weston type 301 d.c. milliammeter.
VM — 0–15-volt Weston type 476 a.c. voltmeter.
VM_1 — 0–5 Weston type 301 d.c. milliameter. (See text.)
VM_2 — 8-0-8 volt Weston type 354 d.c. voltmeter.
Relay 1–Pony keying relay.
Relay 2 — Home-made starting relay.
SW — Neutralizing condenser disconnect.
SW_1 — Crystal selector switch.
SW_2 — Oscillator plate supply change-over.
SW_3 — Starting cam switch and station battery voltmeter switch. (See text).
SW_4 — Generator field switch.
K–Hand key (Vibroplex).
T–High-ratio monitor coupling transformer.
Receivers are cut in on positive B supply lead before it enters Jones cable.
Crystal oscillator tube is a UX-210.
Power amplifier tube is a 50-watt low impedance UV-211.

coupling is RFC_1 of the diagram and is connected in the field lead going to the field rheostat located at the left on the front of the operating table. This choke was found necessary in eliminating a small amount of "hash" in the receiver which resulted from bringing these leads so near the receiver.

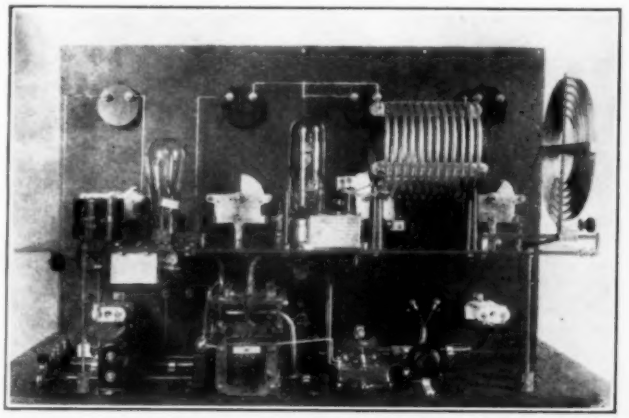
The generator output filter is contained in the compartment at the left and consists of a 1-μfd., 1750-volt condenser, two 1½ henry chokes in series and a second 1-μfd., 1750-volt condenser across the output. A fuse is cut in between the generator and filter in the positive lead for protection in case of condenser failure. The small filter allows just enough modulation to produce a mellow d.c. note. From the filter the d.c. passes through a 300-turn, 3-inch diamater radio frequency choke intended to keep any stray r.f. out of the filter and generator. R.f. is hard on filter condensers and generator windings! A lead sheathed cable carries the high voltage output to another room and to the transmitter.

On the top of the motor-generator box are located the starting relay and a.c. line fuses along with the 400-volt oscillator plate supply. The primary of the Thordarson transformer of this unit is tied in shunt with the motor so that the oscillator plate voltage comes up with the amplifier high voltage. A resistor is shunted across the contacts used for closing the a.c. supply to the primary of the filament transformer and is so adjusted that the tube filaments are at half voltage while the transmitter is idle. This contributes greatly to the life of the tubes where the transmitter is started and stopped at frequent intervals.



THE SHIELDED MOTOR-GENERATOR AND FILTER UNIT

The transmitting antenna is a half wave for 3500 kc. (80-meter band) and is 2065 feet above sea level, 2000 of the feet being hard coal, rock and what not. Its exact location otherwise is Lat. N 40° 57″ 30′, Long. W 76° 15″ 6′. If you are not a navigator or a navigator's offspring, that is Hazleton, Pa., the heart of the hard coal region.

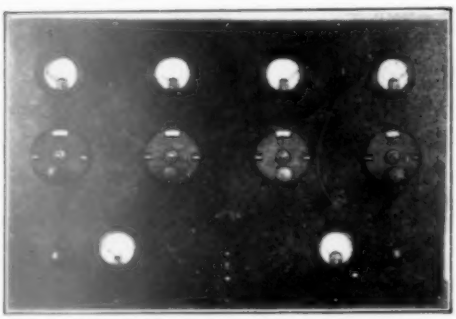


REAR VIEW OF THE 50-WATT CRYSTAL-CONTROLLED TRANSMITTER

The receiving antenna is in approximately the same location and is an indoor affair 30 feet long.

It is admitted that the equipment could be fitted with quite a few up-to-the-minute improvements. For example, in the opinion of many, the receiver sorely needs a 222-r.f. stage and a screen grid peaked audio amplifier. However, plenty of DX rolls in on the present receiver and any increase in sensitivity only adds to the QRM. In designing and constructing the entire station, the cash available for the works was limited. Keeping this all-important point in mind, for the use to which it was intended to put the station, careful consideration was given to compensation in results and strictly unnecessary or unimportant "improvements" weighed against cost. There is often a tendency towards overdoing the job with a total disregard for this point. It is not unusual to find a station equipped with a fine and costly transmitter and a hay-wire receiver composed of junk parts — or *vice versa*. In this case an attempt was made to strike a happy medium. Cost with results desired and necessary for the relay type of station wanted were taken into consideration so as to permit the realization of a well-balanced set up with a wide operating margin of safety and the minimum of up-keep. As to actual results and operation, they are all that could be desired. If they were not, the thing would be silent until such time as improvements or corrections could be made. Everything must perform its intended work perfectly. New ideas and the theories of others are not always taken for granted as being the last word.

An investigation is made, variations are tried and the resultant change or improvement is incorporated if found satisfactory. This accounts for the few deviations from the beaten path. Pride is taken in the manner in which the entire station is handled; business-like operation



THE SYMMETRICALLY ARRANGED TRANSMITTER PANEL

with a business-like signal from a business-like station. Any constructive criticism is always gratefully received.

Book Reviews

By H. P. Westman, *Tech. Ed.*

RADIO Operating Questions and Answers, second revised and enlarged edition, by Nilson and Hornung. Published by McGraw-Hill Book Company of New York City. 242 pages and 91 figures with two appendices of 18 pages total. Price, $2.00.

The fact that this book is a very queer mixture of the most modern and extremely antique and obsolete of radio equipment is no reflection upon the authors. It is due entirely to the fact that one must consider the commercial aspects of radio which prohibit from financial considerations the junking of all ship equipment that is not of the most advanced type. Therefore, it behooves those responsible for the licensing of radio operators, who may be called upon to take charge of most any sort of an installation, to include questions testing the ability of the candidate to meet those situations that are likely to confront him. The authors in their effort to fulfill their responsibility to the embryonic wireless operator must heed these conditions and it is for this reason that we find such devices as crystal detectors, spark-coil and arc transmitters rubbing shoulders with the more modern equipment based upon the vacuum tube as a detector, amplifier and oscillation generator. In addition to covering commercial ship-board conditions, a pleasant, though short chapter is devoted to amateur station practises and a somewhat longer one to the problems of the broadcast man. It should be of great assistance to the man who has had no commercial experience and must familiarize himself with that field through a textbook.

The *Radio Manual*, by George E. Sterling, edited by Robert S. Kruse, B.S. Published by D. Van Nostrand Company, New York City. Contains 654 pages and 273 figures. Price, $6.00.

Most authors are content to write a book about a certain branch of radio but in this case the aim seems to have been to cover the field in its entirety. One may find data on ship installations, broadcast, amateur and commercial high-frequency equipment as well as fundamentals of electricity and magnetism, vacuum tube theory and operating practises. Even the present-day radio laws may be found between its covers. In short it covers modern radio design, practise and operating almost regardless of the type of station one may be considering. It is, perhaps, one of the most complete books ever written concerning practical radio equipment and methods. It is intensely practical and, being based primarily upon modern equipment, is of considerable worth to the man whose interest in radio is a wide one. Throughout, the author attacks problems from the angle of the man who must operate the equipment, making extremely little use of mathematics or involved theorizing.

The commercial ship operator will find it valuable, covering as it does not only spark, arc and tube ship-board radio equipment, but storage batteries and motor-generators as well. The broadcast station operator will, likewise, find much to interest him concerning modern broadcast equipment and methods.

The Radio Industry, published by A. W. Shaw Company of New York City. 321 pages, 30 figures. Price, $5.00.

The reason no author's name is included in the above is because this work is the result of the efforts of a number of contributors of prominence in the radio industry. It is based upon a series of lectures delivered during 1927 and 1928 at the Harvard Graduate School of Business Administration as part of the Business Policy course.

A résumé of early radio developments is presented by Elmer E. Bucher, Assistant Vice-President of the R.C.A., which is followed by a history of radio's service during the world war written by General J. G. Harbord, President of the R.C.A. Developments since 1920 are portrayed by David Sarnoff, Vice-President of the R.C.A. The development of radio telephony as a communication means is covered by Dr. Frank B. Jewett, Vice-President of the A. T. & T. Research, and manufacturing problems are discussed by E. P. Edwards, Manager of the Radio Department of the General Electric Company.

The law of the air is presented by Judge Stephen B. Davis of New York City who outlines the development of the early radio laws and shows how the present congested conditions have come about.

H. P. Davis, Vice-President of the Westinghouse Electric and Manufacturing Company, tells about the early history of broadcasting and the modern version of the story is the work of Merlin H. Aylesworth, President of the National Broadcasting Company.

The distribution and merchandising of radio sets and the methods of advertising such equipment are covered by J. L. Ray, General Sales Manager, and Pierre Boucheron, Advertising Manager of the R.C.A., respectively. A short chapter on the application of radio principles and devices to other industries and an appendix covering some radio principles are the work of Harold C. Weber of Massachusetts Institute of Technology.

This book does not concern itself to any great extent with the technicalities of radio communication. It is primarily concerned with its past and present history and slightly with possible future developments.

Several of the papers contain a distinct undertone to the effect that there is no octopus-like monopoly strangling the industry and that a monopoly of communications should not be considered as damaging as most are wont to believe all monopolies are.

Two Recently-Announced Tubes

The UY-224 and the UX-245

By Harold P. Westman, *Technical Editor*

THE first title considered for this article was "Two New Tubes" but mature reflection indicated that while these two tubes were but recently announced, they were, nevertheless, new to neither the industry nor the general public. Both have been mentioned and discussed to some extent in the radio press during the past few months and the fact that they would some day appear upon the market seemed well established in the minds of most.

The UY-224 which we shall discuss first is a screen-grid tube provided with a heater for operation on alternating current. It is the much-talked-of a.c. screen-grid tube. However, one must not jump at the logical conclusion and consider it as being an a.c. "222". This is not the case and the 224 must be considered as a distinct identity having constants all its own. Although it fulfills for the a.c. operated set the function of the 222 in a d.c. operated one, it is distinctly itself and is interchangeable with no present-day tube.

It is primarily used as a radio frequency amplifier but may also be used as a detector. Operation may be with either screen-grid or space-charge connection depending upon the characteristics desired.

The normal plate and heater voltages are:

Heater voltage	2.5 volts a.c. or d.c.
Heater current	1.75 amperes.
Plate voltage, maximum and recommended	180 volts.
Grid bias, negative	1.5 volts.
Screen voltage, maximum	75.

Under these conditions the following characteristics are obtained; values for the UX-222 under the same plate, screen and grid voltages are given for comparison.

	UY-224	*UX-222*[1]
Plate current	4 mils.	1.5 mils.
Screen current not over ⅕ of plate current		
Plate resistance	400,000 ohms	850,000 ohms
Amplification factor	420	300
Mutual conductance, microhms	1050	350

DIRECT INTER-ELECTRODE CAPACITANCES

Effective grid to plate	0.01 μμfd. Max.	0.02 μμfd. Max.
Input	5. μμfd.	6. μμfd.
Output	12. μμfd.	15. μμfd.

The 224 is quite similar in appearance to the 222 although they may be easily told apart by the base, the 224 having a five-prong, UY base and the 222 a UX, four-prong one. In addition, the outer screen of the 224 is considerably larger in diameter than is the 222's and one may see the insulating strip supporting the heater unit peeping out the top of the assembly. The metal cap on top of the bulb is the control grid terminal, the screen terminating at the grid prong of the base.

Heaters may be operated in parallel as long as sufficiently heavy wire is employed to handle the current required by the number of tubes in use. All a.c. leads should be of twisted pair to eliminate hum and the connection between the cathode and the heater is preferably made to the movable arm of a potentiometer connected across the heater terminals. If a potentiometer is not provided, a center-tapped resistor should be employed or the connection made to the center of the transformer winding supplying the heater. It is sometimes helpful to bias the heater negative in respect to the cathode to eliminate residual hum. The voltage necessary to obtain all the improvement from this source that can be had should not exceed 9 volts. Tubes should not be removed from their sockets without first turning off the heater voltage as the considerable reduction in load current may cause the voltage across the other tubes to reach a damaging value.

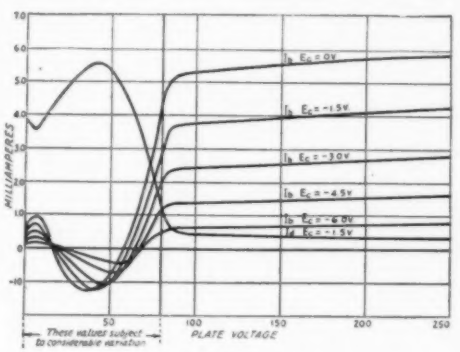


FIG. 1

Showing the plate and screen currents plotted against the plate voltage with normal heater voltage and current and a screen-grid potential, Ed, of 75 volts. Ec is the control grid voltage, Ib is the plate current and Id is the screen-grid current. Individual tubes vary considerably in their operation at plate voltages lower than the screen-grid voltage and for this reason the portion of the curves to the left of the heavy vertical line cannot be considered as highly accurate.

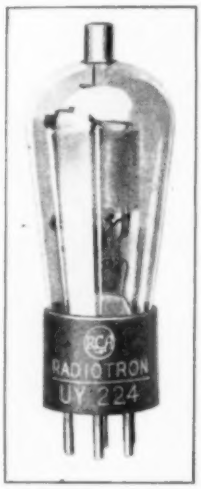
[1]The values for the 222 are obtained with normal plate and screen voltages which are 135 and 45 volts respectively.

The voltage for the screen may be obtained from a tap off the plate battery or battery substitute. It is not recommended that it be obtained by means of a high resistance between the screen and the plate voltage supply tap because the screen current will vary considerably with different tubes. The use of a potentiometer to control the screen voltage will provide an excellent volume control as the screen potential affects the mutual conductance and, hence, the effectiveness of the tube as an amplifier.

Although neutralization is not necessary to prevent oscillation, it is essential in cascade amplifiers to provide sufficient shielding to eliminate feedback external to the tubes. If this is not done, it will be impossible to realize the huge gain of which the tube is capable. Each stage should be shielded from all others and by-pass condensers and chokes provided to reduce coupling between stages through the common power supply device. Very short leads should be provided from the screen to the by-pass condenser and to the ground in order that the screen be as near ground potential as possible. Because howling or motor-boating may be caused by the use of tuned impedances as coupling units between stages, the use of r.f. transformers is recommended. Such trouble should not occur if the plate source is of low impedance, though.

The 224 may be employed as a screen-grid detector and although it may be operated with either grid condenser and leak or grid bias, the latter is preferred. The plate coupling should be a resistor of between 200,000 and 500,000 ohms, 250,000 ohms being a good value, and the plate supply voltage should be raised to 200 volts. With a screen-voltage of 45, the control grid voltage should be adjusted to obtain a plate current of 0.1 milliampere when there is no signal impressed upon the grid. This bias will be about 5 volts. Grid leak and condenser detection may be employed with the same plate resistor and plate and screen voltages. Either type of detection should provide an output that requires no more than a single stage of audio amplification. The use of two stages may cause an excessive hum.

So much for the UY-224.



THE UY-224, AN A.C. SCREEN-GRID TUBE

Its appearance is similar to that of the UX-222 although a UY base is employed. Its electrical characteristics are quite different, though, and these tubes are not interchangeable.

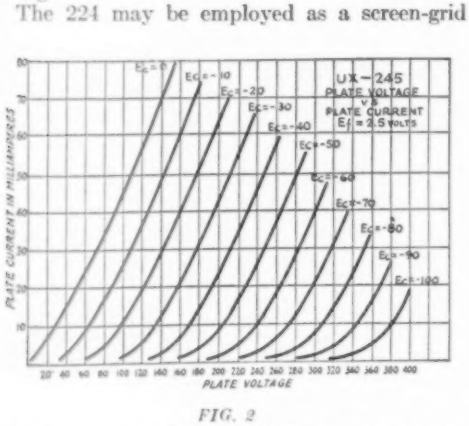


FIG. 2

In these curves, the plate current is plotted against the plate voltage for various values of grid voltage. By drawing in suitable load lines, the output and amount of distortion may be calculated.

UX-245

The 245 is a cross breed between a 210 and a 171 with a few other characteristics. It has a low μ and is capable of delivering over a watt and a half of undistorted power with a plate voltage of but 250. To make things more interesting, the filament is of the "heavy" variety and may be operated on either a.c. or d.c. requiring 2.5 volts and 1.5 amperes to get properly "het" up. It is, therefore, possible to build a set with all the necessary types of r.f., detector and power tubes without requiring more than a single filament voltage. The importance of this fact may be realized by attempting to wire up a receiver employing three different types of tubes no two of which have the same filament or heater characteristics.

The following tabulation will give some idea as to the position of the 245 in respect to the other tubes devised for last stage operation.

	UX-245		*UX-171-A*	*UX-210*	*UX-250*
Plate voltage	180	250	180	425	450
Plate current, mils.	26	32	20	18	55
Grid voltage, negative	33	50	43	39	84
Peak grid swing	33	50	43	39	84
Plate resistance, ohms	1950	1900	2000	5000	1800
Amplification constant	3.5	3.5	3	8	3.8
Mutual Conductance, microhms	1800	1850	1500	1600	2100
Undistorted power output, milliwatts	780	1600	720	1600	4600

The most impressive fact is that it is possible with a plate voltage of but 250 to obtain with a UX-245, the same undistorted output rating as can be had from a 210 with 425 volts on the plate. If we had had this tube a few years ago think of all

the wear and tear on filter condensers that would have been saved, to say nothing of worry and trouble to the manufacturer of these units. However, the industry has probably learned a few things about the manufacture and rating of filter condensers so the public should be somewhat ahead on the works.

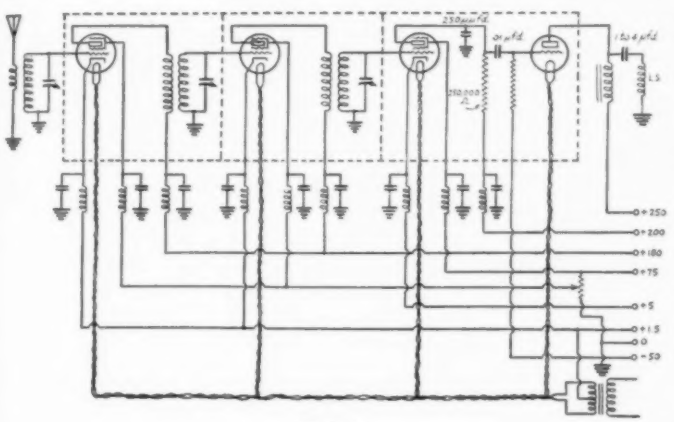


FIG. 3

This circuit shows two UY-224's employed as radio-frequency amplifiers and a third as a grid-bias detector. A single audio stage using a UX-245 is provided. All battery leads are by-passed with 0.01 μfd. condensers which in conjunction with the r.f. chokes shown, prevent coupling between stages due to the use of a common power supply system.

There is little more need be said about this tube other than that the windings of a loud speaker are not normally designed to carry currents of 25 or 30 mils and a suitable output device must, therefore, be provided. This may be in the form of an output transformer or choke and condenser rig. The latter arrangement is shown in the circuit diagram and note should be taken that the return from the speaker goes to the B-terminal and not to the low side of the choke. This saves the a.c. the trouble of wandering through the "B" substitute and, perhaps, elsewhere.

As in the case of the UX-250, the UX-245 is not designed or recommended for oscillator work and although it may be possible to obtain satisfactory operation with some of the tubes, trouble from secondary emission from the grid will normally be encountered. It should, however, make a nice output tube for the low-powered oscillator-amplifier transmitter, the maximum plate voltage needed being but 250.

The New England Division Convention

SPRINGFIELD, MASS., was the Mecca of "Hams" from all over New England on April 19th and 20th. With the largest registration on the first day of any previous convention the committee in charge saw to it that the program was carried out to the letter. With well chosen words, President Sias, of the Springfield Radio Association, which sponsored the convention, extended a cordial welcome to the delegates which was responded to by Treasurer Hebert of A.R.R.L. Headquarters, who also expressed his thanks to the Springfield Chamber of Commerce for their fine coöperation in handling the publicity.

With practically every Section Communications Manager in attendance, a very instructive meeting took place in the afternoon — principal remarks being made by Director Best, who made his first appearance in his official capacity, and by Communications Manager Handy.

Assistant Radio Supervisor Butterworth and Junior Radio Inspector Weston had their hands full with examinations for operator's licenses and some 55 fellows are now possessors of a regular ticket.

A precedent was established by serving supper to the gang. This kept every one together, and after the tables were cleared a general stretch was had by every one before settling down to listen to the "liars" and "stunt-pullers." Woodrow Darrow, W1AOZ, was the best liar and Bailey, W1KH, the second best. Those two have *some* imagination.

One of the pleasant surprises of the convention was the visit to the plant of the Westinghouse Electric & Manufacturing Co. at Chicopee Falls, a short distance from Springfield, where Mr. Hutchinson of the Radio Engineering Department, played host. This trip proved most instructive and gave the delegates an opportunity to see the latest development in short-wave commercial transmitters, direction finders and motion-picture talkies. We are, indeed, very much indebted to Westinghouse and Mr. Hutchinson, for the courtesies extended. A visit to WBZ was also made.

Saturday afternoon had so many good items on the program that it kept the big crowd interested all the time. C. N. Kraus, W1BCR, gave a good talk on television, and demonstrated its principles. Mr. Kraus also showed some 5-meter experiments. Col. Van Horn, Signal Corps, U. S. Army, made a few remarks on the Army-Amateur Net Work and then introduced Capt. J. C. Platt, Jr., Signal Corps Liaison Officer, who reviewed in detail the present Net Work and what such an arrangement means in time of

(*Continued on page 82*)

Experimenters' Section

IN accordance with the arrangements outlined in the last Section report, we are presenting this month the outline on problem R12 covering radio-frequency amplification for amateur bands.

PROBLEM R12 — RADIO-FREQUENCY AMPLIFIERS FOR THE AMATEUR BANDS

The problem of radio-frequency amplification offers two distinct methods of attack; amplification may be obtained at the signal frequency or the use of an intermediate frequency may be resorted to in order to obtain the necessary gain and stability. This latter method received most attention and gave better results for many years but with the advent of the screen-grid tube, the problem took on a decidedly different aspect. It is now possible to amplify at the signal frequency with satisfactory gain and stability. As in any other like subject, though, there are many differences of opinion as to the most desirable characteristics and the problem of simplifying the control of r.f. receivers is an important one. The use of shielding as well as the filtration of common battery leads calls for considerable attention. One must also take cognizance of the tuned vs. untuned angle of the case. Taking the subject by and large, much has already been done and still more remains to be accomplished. The past history may be obtained from the following bibliography.

QST

The Neutrodyne C.W. Tuner at 9ZT. (Wallace) Jan. 1925.

Measuring Very Small R.F. Currents. (Turnbull) Jan. 1925.

The Regenaformer. (Browning) April, 1925.

The Isofarad Receiver. (Minnium) May, 1925.

Improving the R.F. Amplifier. (Burns) May, 1925.

Measurements of the Voltage Ratio of Audio and Radio Transformers. (Ramsey) August, 1925.

Adding Punch to Your Neutrodyne. (Budlong) Sept. 1925.

A True Cascade R.F. Amplifier. (Hull) October, 1925.

The One-Stage R.F. Amplifier. (Pendleton) Nov. 1925.

A Three-Tube Neutrodyne for Short Waves. (Ablowich) December, 1925.

Shielded R.F. Stages. (Clayton) September, 1926.

R.F. Amplification — A Rehash. (Lyford) Nov. 1926.

A Short-Wave R.F. Amplifier. (Bouck) Nov. 1926.

A Short-Wave Super-Regenerative Receiver. (Dallin) January, 1927.

Radio Frequency Transformer Design in Voltage-Stabilized Systems. (Marco) Feb. 1927.

Theory of a Tuned R.F. Transformer. (Browning and Drake) March, 1927.

Some Tests With R.F. Amplifiers Below 200 Meters. (Deckendorf) May, 1927.

An R.F. Amplifier of Uniform Sensitivity. (Mesa) May, 1927.

A Super-Regenerative 5-Meter Receiver. (Jones) June, 1927.

A Combined Super-Heterodyne and Detector-Audio 20-Meter and 5-Meter Receiver. (Kruse) June, 1927.

This Short-Wave Amplifier Business. (Bourne) Aug. 1927.

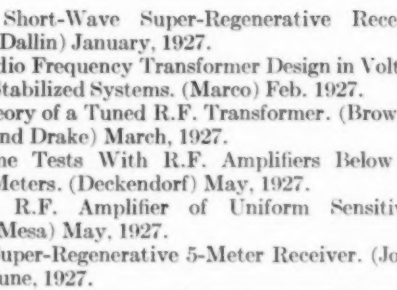


FIG. 1. — THE CIRCUIT ARRANGEMENT OF THE AUTO TRANSFORMER IS GIVEN ABOVE

It will allow the voltage applied to the load to be either above or below the line voltage depending upon the position of the two switches. When the line tap is connected to a point between the top of the winding and the tap to the load, the voltage across the load will be lower than the line voltage. When the line is connected to the winding at a point between the load tap and the bottom end of the winding, the load will be at a higher voltage than the line.

The UX-222 Shield-Grid Tube. (Kruse) Dec. 1927.

The Shield-Grid Tube As an R.F. Amplifier. (Kruse) Dec. 1927.

Short-Wave R.F. Amplifiers. (Westman) Dec. 1927.

Getting the Most Out of the UX-222. (Bourne) Dec. 1927.

Double-Detection Receivers With Band-Pass Filters and Screen-Grid Amplifiers. (Taylor) March, 1928.

The UX-222 As a Short-Wave Amplifier. (Lidbury) April, 1928.

A Super-Regenerator for Short Waves. (Hart) July, 1928.

A Super-Heterodyne for High Frequencies. (Gluck) Oct. 1928.

Receiver Characteristics and Their Measurements. (Landon) Oct. 1928.

High-Frequency Receivers for the Coming Year. (Hull) Nov. 1928.
An Improved Super-Heterodyne. (Grigg) Dec. 1928.
A 1929 Receiver. (Hendricks) Feb. 1929.
Improving Short-Wave Phone Reception. (Hull) March, 1929.

PROCEEDINGS OF INSTITUTE OF RADIO ENGINEERS

The Limit of Regeneration. (Little) Aug. 1924.
An Analysis of Regeneration. (Landon and Jarvis) Dec. 1925.
An Efficient Tuned Radio Frequency Transformer. (Browning and Drake) Dec. 1925.
Combined Electromagnetic and Electrostatic Coupling and Some Uses of the Combination. (Loftin and White) Oct. 1926.
Influence on the Amplification of a Common Impedance in the Plate Circuits of Amplifiers. (Anderson) March, 1927.
Notes on Radio Receiver Measurements. (Smith and Rodwin) May, 1927.
A Mathematical Study of Radio Frequency Amplification. (Smith) June, 1927.
Measurements of Radio Frequency Amplification. (Harris) July, 1927.
Note on R.F. Transformer Theory. (Diamond and Stowell) Sept. 1928.
A Method of Treating Resistance Stabilized Radio Frequency Amplifying Circuits. (Snavely and Webb) Jan. 1929.

Obviously all of these references do not directly concern themselves with high-frequency amplifiers. However, many of them contain material of interest and importance which is applicable to the problem in hand and a study of them can only improve one's knowledge of the subject and help considerably in the final analysis.

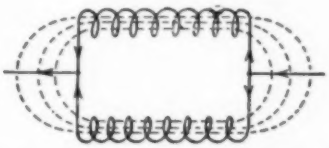


FIG. 2. — THE BINOCULAR TYPE OF WINDING DISCUSSED IN THE TEXT

The magnetic filed threads through both coils and there is little external field. Because two coils are in parallel, each will have to be larger than a single coil if it were employed.

A BOOSTER TRANSFORMER

Just after dark when the DX gets good and the peak load is placed on the 110-volt line and you watch your plate and filament voltage slide off until you couldn't raise Oshkosh, how you long for a hokus that would squeeze a few more volts out of that line! Well, the object of this little squib is to tell how to make such a thing.

It is our old friend the auto transformer and it may be used either to reduce the line voltage or increase it depending upon the manner in which it is connected to the line and load. The primary winding is not called upon to handle the entire load and so can be wound with fairly light wire. For general work 400 turns of No. 20 d.c.c. wire wound on a core whose cross section is $1\frac{3}{4}$ inches by $1\frac{3}{4}$ inches will do. A window $2\frac{1}{2}$ inches long by $1\frac{1}{2}$ inches wide will do nicely and will make the outer dimensions of the core 6 inches by 5 inches. Standard laminated core material should be used and a pile 3.5 inches high of $1\frac{3}{4}$ by $4\frac{1}{4}$ inch pieces will do for the two long legs. The shorter legs will require a $3\frac{1}{2}$ inch pile of $1\frac{3}{4}$ by $3\frac{1}{4}$ inch material.

The secondary winding may consist of 100 turns of No. 14 d.c.c. wire wound either over the primary or on the other long leg of the core. This winding should be tapped every five turns so that the output voltage may be varied to suit the characteristics of the load. These taps should be brought out to a heavy-duty tap switch and connected to only every other switchpoint so as not to short circuit part of the winding when running the switch blade across the points. It is, of course, not absolutely essential that a switch be provided, the change can be made by means of a heavy clip as long as good contact is made with the tap.

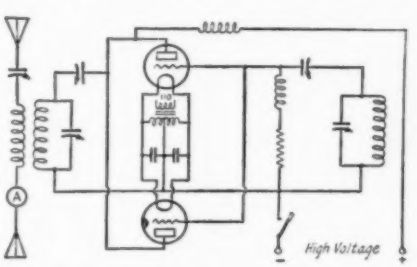


FIG. 3. — THE CIRCUIT DIAGRAM OF THE TUNED-PLATE, TUNED-GRID TRANSMITTER SHOWN IN THE PHOTO

A pair of 210's is connected in parallel.

By means of the transformer, the line voltage can be increased by approximately 25 per cent or decreased by about 20 per cent depending upon the connections employed. It is good practice to obtain the use of a suitable voltmeter and measure the voltage obtained under the many possible connections and make a record so that there will be no guess work involved when making a change. It must also be remembered that the line voltage is usually lowest at about nine o'clock in the evening, rising steadily until it gets back to normal. Don't set the transformer to operate properly under the lowest line voltage and then turn the set on the next morning when the voltage is high without previously making the proper readjustment to suit the changed condi-

tions. It's rather expensive to light the room with XL filaments!

— *J. E. Deines, W9CV,*
940 Brooks St., Topeka, Kansas.

SOME SUGGESTIONS IN THE DESIGN OF THE OSCILLATOR-DETECTOR CIRCUIT

By C. A. Hultberg *

For highest efficiency in reception where distortion of the incoming wave due to the cutting of side-bands is of little importance, such as in the case of telegraphy, and where increased selectivity is paramount, a receiving circuit should be designed to have a high gain factor in the grid circuit.

The gain factor is expressed

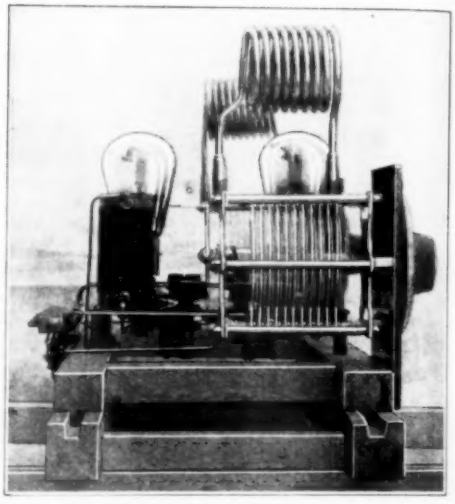
$$G=\frac{2\pi f L_0}{R} \text{ or } G=\frac{1}{R}\sqrt{\frac{L_0}{C}}$$

Thus it is evident that the ratio of inductance to capacitance should be high and the radio frequency resistance low. Such a condition may be realized by the proper design of the inductance and a judicious choice of the type of receiving condenser used.

In a tuned-grid, tuned-plate receiver, oscillations take place when the two circuits approach resonance and in many cases the circuits are out of resonance to a degree of several kilocycles; this difference frequency may be above the audible range of frequencies. In such a case, the oscillations will take place at the frequency of the circuit having the highest C/R ratio. Making use of this fact we can tune the plate circuit by means of a small inductance and large capacitance (as compared with the grid circuit) and when oscillations occur their frequency will be determined by the tuning of the plate circuit.

We can then tune the grid circuit to resonance with the incoming signal to impress the greatest voltage on the grid and tune the plate circuit which controls the oscillation frequency to a frequency different enough to produce beats.

This is of magnified importance when the beat note is high as is the case in super-heterodyne reception where the first detector is utilized also for the production of oscillations.



A SIDE VIEW OF THE TRANSMITTER SHOWING THE RAILS UPON WHICH IT MAY BE SLID IN ORDER TO ADJUST THE ANTENNA COUPLING

Large capacities are used for tuning the plate and grid circuits and the midget condensers used as variable blocking units may be seen within the wooden frame just below the nearest tuning condenser and in front of the r.f. choke.

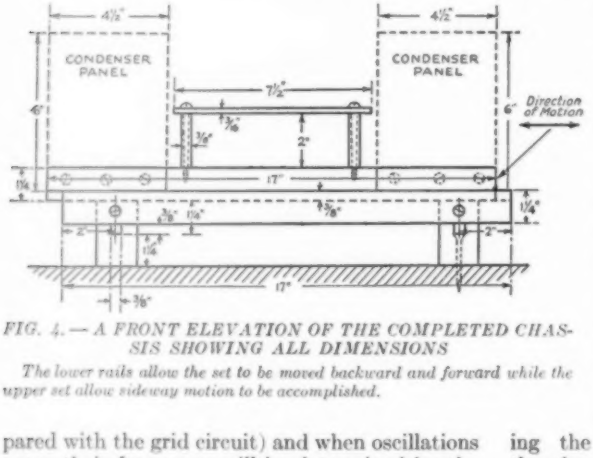


FIG. 4. — A FRONT ELEVATION OF THE COMPLETED CHASSIS SHOWING ALL DIMENSIONS

The lower rails allow the set to be moved backward and forward while the upper set allow sideway motion to be accomplished.

The increase in the gain factor with the use of binocular coils should be advantageous. This method of winding consists of two solenoids in parallel so wound as to make the field of one close upon the field of the other.

Referring to Fig. 2, it will be seen that if the two solenoids are wound so that the turns are in the opposite directions (one left-hand winding and the other right-hand winding) the field polarity of the two coils will be reversed and the flux will tend to form a closed path through both coils. Since each turn of one coil is at the same instantaneous potential as the corresponding turn of the other coil the two may be mounted as close together as you wish without materially increasing the distributed capacity. They should, therefore, be mounted very close together so as to shorten the magnetic path.

Since the two coils are in parallel each should have an inductance twice as great as required in the circuit, L_0. Two wires in parallel have a lower

* 5432 23d St., Detroit, Mich.

resistance which means that the wires may be smaller which reduces the distributed capacity.

If the fields of the two coils did not interlink the inductance of either alone would be

$$L_0 = \frac{4\pi^2 a^2 n^2 k}{b}$$

from Nagokoa's formula where k takes into account the leakage flux. Since the leakage flux is diminished when the fields interlink by the amount of the mutual flux which varies with the proximity of the coils and their physical dimensions, no exact formula for the correct number of turns can very well be expressed.

If there were no interlinkage the number of turns for a coil of inductance 2 L_0 would be $\sqrt{2}n_1$ where n_1 equals the number of turns for a coil of inductance L_0. Therefore, it is safe to assume that the number of turns for each of the two solenoids will be $n_2 < \sqrt{2}n_1$ or if your coil has 10 turns, you could use two coils properly wound in parallel of less than 14 turns each. The diameters will remain the same.

The oscillating circuit losses will not have as great an effect on the grid voltage impressed on the detector as the gain factor of the grid circuit will, so it is doubtful if much advantage would be had by using such a coil in the plate circuit.

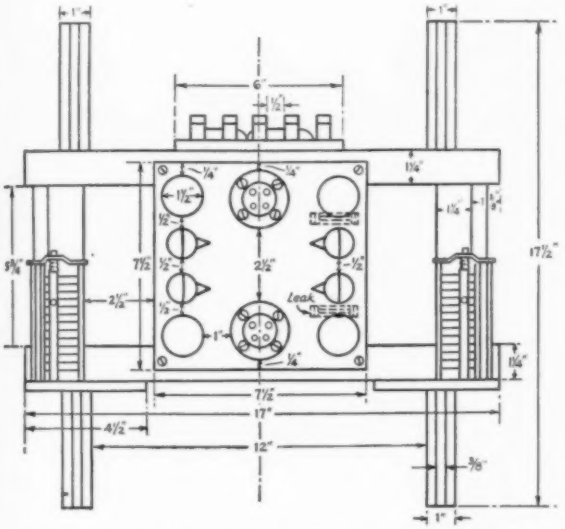


FIG. 5. — A PLAN LAYOUT OF THE TRANSMITTER SHOWING THE GENERAL ARRANGEMENT OF THE VARIOUS PARTS

The tubes, chokes, leaks and blocking condensers are mounted on the center platform while the two tuning condensers are arranged on small panels at the sides.

A LOW-POWER TRANSMITTER CHASSIS

By A. Binneweg, Jr.*

The electrical details of low-power transmitters as used in the majority of amateur stations have been discussed many times in these columns. An efficient transmitter employing the tuned-plate, tuned-grid circuit is shown in the illustration. Its electrical features do not depart greatly from the usual transmitter employing the same circuit. However, the mechanical arrangement of the set has some distinct advantages as will be described.

The proper coupling between the primary and antenna coils is important and is often difficult to secure especially if the coils are mounted efficiently as in this set. It is usually good practice to mount the antenna coil rigidly which means that the plate coil must be adjusted in some way.

As shown in the illustration, the entire set is mounted on a light wooden frame that slides in a second similar frame by means of loose tongue and groove joints. This second frame is arranged so as to move freely upon two rails at right angles to the motion of the first frame. It is obvious that there should be little difficulty in securing the proper coupling if the set is mounted approximately in correct relation to the antenna coil at the start.

In this arrangement the only leads that need be flexible are the plate and filament leads and a little bending of these while experimenting for proper values is of no consequence. All connections are made to large posts on a bakelite piece at the rear of the set. The filament by-pass condensers are mounted directly across the filament posts.

The mechanical arrangement of this set should appeal to the amateur who goes about the design of his transmitter in a systematic manner. It is of the "open" type of construction which appeals to the visiting radio friends and allows changes to be made easily and readily.

All dimensions and details of the transmitter and chassis are given for those who wish to duplicate an arrangement which has proved both simple and flexible in practice. Although the electrical details do not depart from the usual, a circuit, Fig. 3, employing a simple antenna is given.

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How to Photograph Your Transmitter By Electric Lights

By E. H. Harrington, Jr.*

As ham layouts are so frequently in dark places where it is difficult to get proper illumination for taking photographs by any usual means, I am passing on the following information in the hope that it will be helpful to others who wish to keep a photographic record of their various radio stations, or are considering writing up their stations for *QST*. The results from this method are usually better than from photographs taken by daylight. It also has the advantage that the operation can be performed at any time of day or night with equal results.

Any ordinary folding pocket Kodak or similar camera — or even a box type of camera — will be perfectly satisfactory. A tripod is convenient, but if one is not available the camera can be firmly placed on a box or table at the correct distance and elevation.

The only equipment necessary, in addition to the camera, is the source of light. This should have a reflector made of white paper or smooth-surface cardboard two or three feet across. This may be used flat, or, better, conical in shape, made after the fashion of the cardboard diaphragms commonly used in cone speakers. Next take a 200-watt Mazda bulb and screw it into the socket on the end of a cord, forcing it through the center of the reflector. If a 200-watt bulb is not available, two 100-watt bulbs or four 50-watt bulbs may be substituted. If more than one bulb is used they should be mounted so as to be concentrated as nearly as possible in the center of the reflector.

To take the picture, focus the camera on the subject and stop down the lens to about f.16. In using a box type camera remember that the focus is fixed and the picture cannot be taken closer than about six feet. When this type camera is used, use the smallest sized opening. Now shut all door and window openings, if photographing in the daytime, to exclude light other than will be supplied by the source you have prepared. Set the shutter for "time exposure," open it, and direct the light from the reflector on the subject. Holding the reflector in your hand, move it around so that the light from it shines on the object from various angles, always being careful, however, that you do not get anywhere near into the field of vision of the camera. The light source should always be back of the camera or well to one side of it so that the direct light can never fall on the lens. Keep the light moving during the whole exposure in order that, by coming from various angles, all parts of the subject will be well illuminated, and deep shadows eliminated. Direct the light onto the darker parts of the subject most. In this way the lighting will be balanced so that the details in the darker parts will show up well. When the subject as a whole is fairly light-colored, the total exposure should be three or four minutes. With medium colored subjects the time should be four to five minutes and for dark subjects five to six minutes. The "latitude" of modern Kodak film is very great, so that it is not difficult to gauge the exposure closely enough to get a perfectly satisfactory picture. However, it is a good plan and will sometimes save trouble to take two or three pictures while the arrangement is all set up, giving different times of exposure, in order to be sure that one or the other will be just about perfect.

The time of exposure is somewhat dependent on the size of the layout you are photographing. A large set covering a whole table will require a somewhat longer exposure than a "close-up" of a single piece of apparatus.

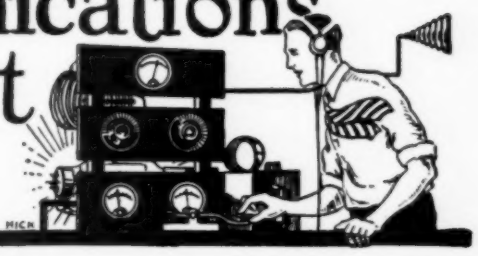
Remember that during the exposure the camera and the object being photographed must be perfectly steady. The slightest movement will make the picture fuzzy.

If your layout happens to be in front of a window, or if there is a window in view, it is usually better looking if the window is shown without the shade drawn. It is possible to do this — but not by leaving the shade up all the time the picture is taken. That would result in fogging the whole picture. The picture should be taken in the fashion described, making sure that the shade, when drawn, is a nice snug fit to the frame, so that its outlines are not too apparent. Then after taking the picture and having closed the shutter, leave the camera and everything else exactly in position, but put up the window shade. Then take another exposure, either an instantaneous snapshot or a "bulb" exposure of a fraction of a second. This will get the bars in the window and make the whole picture more natural. Of course this must be done by daylight.

[After having taken a couple of good shots of your layout as described by Mr. Harrington, write up a description of your station and send it all in to *QST* as your entry in the Station Contest. See page 37 of the March issue of *QST*. — EDITOR.]

*9CRR, 323 W. Exchange St., Geneseo, Ill.

The Communications Department



F. E. Handy, Communications Manager
L. R. Huber, Asst. to Coms. Mgr.
1711 Park St., Hartford, Conn.

What Is an Amateur?*

By John Escobar**

A RADIO amateur is a person who is possessed of the desire to accumulate quantities of coils, condensers, and tubes that he can connect together. With them thus connected, he turns a switch, presses a key, and sends a call forth into the next state, country or continent. Such a person can boast that he is a radio amateur.

But let us go further. Can he boast that he is a *good* radio amateur?

Are the coils, condensers and tubes that he accumulates hooked up in the best possible manner, so that when he turns on his switch his tubes can glow with honest pride over the assembly of gadgets and thingumbobs and doodinguses that adorn his table? When he presses his key will the signal thus sent forth be the clean-cut and pure note that we have come to expect of present-day transmitters?

When his brother in the next state or country or continent hears this signal will his eyes brighten with satisfaction and will he smile and say, "Ah! there is Brother Duzzemright. Has he not *the good signal?*"

Or, when the brother across the way hears the signal, will he bite his lip and scowl and mutter oaths and curses?

A radio amateur is a radio amateur; but is he a *good radio amateur?*

Let us suppose that he *does* have his whiffletits and dingbats and whatcham'callits connected and adjusted properly, and that when he steps on the brass the resulting signal is clean-cut and sharp and, forsooth, when his neighbor hears it he is moved to admiration. The transmitter, we shall suppose, is in keeping with the very best precepts.

Then let us notice if this radio amateur sends properly. Are the dots and dashes that he forms of the right length? Does he leave enough spacing between the letters of every word? And does he leave a double space between words, in order that the man in the next state will be able to copy his sending "letter perfect?" Does he know the legitimate abbreviations and the Q signals — *know them?*

Or does he slouch down in his chair, rattle away at his Vibroplex, and listen for a reply to a signal that would hardly be readable even to the sender, if he should take the trouble to listen to it? Does he spend hours gumming up the ether with small talk about his and the other fellow's "sweet" and "xtal" note?

A radio amateur may have a good signal, but is he a GOOD OPERATOR?

Now we shall presume that out model has an excellent transmitter and an excellent signal, and that his operating is the very best. Next we shall ask about his attitude toward others.

Does he stay within the legitimate amateur bands? If he is a DX man does he concede to his brother the traffic man the respect that he thinks he himself deserves? If he is a traffic man is he liberal minded toward his fellow the DX man?

Is he industrious in his adopted art? Does he take the trouble to study *QST* and the Handbook so that he can cure key clicks and maintain the good performance of his transmitter and receiver?

Or does he let George, the next-door BCL, worry about the key clicks?

Does he keep his station in condition for inspection so that he could show it to the Supervisor of Radio with pride? Let us hope that he does, and that he could show likewise his log and message file carefully kept and with all important data neatly penciled, penned or typewritten in just the corner it should occupy.

When the station is fully considered, what of the amateur as a man? Does he take an interest in the betterment of amateur radio in all its phases? Does he attend local club meetings and do all that is expected of him in the business of keeping up local and national organization? Does he pull with a will toward a logical and sensible goal — *the right thing at the right place at the right time?*

Or does he haul back on the reins and mewl and complain because somebody in the lead has, he thinks, done something that does not exactly suit him, but which, nevertheless, required a good deal more work than he was willing to put forth?

You, and I — we are both, perhaps, radio amateurs, and we enjoy our hobby. But if we look further we shall discover in addition that we can be GOOD radio amateurs and thereby increase the enjoyment of our hobby manifold.

* A talk presented before a meeting of the Hackensack Radio Association.

** W2CRO — 27 Poplar Ave., Hackensack, N. J.

28 MC.

MORE and more progress is being made in the use of this frequency, and a great deal of this work due to increasing use of 28 mc. on the part of amateurs in foreign lands.

W9EF (Wm. Short, Hammond, Indiana) has some fine work to his credit and has also gathered in a fine bunch of data on 28-mc. conditions and results — most of the information from other countries being received in the course of 14,000-kc. operation.

ZL2AC heard both W6AM and W7ACS on 28 mc. on March 10th. G5HS received 28,850-kc. transmissions from W9EF March 3d at 1700 Greenwich. March 17th appeared to be a poor day for work on this frequency, W2JN, NKF, and west coast stations reporting no signals at all heard on this date.

VT2KT (India) has had two-way communication with seven different English and one Finnish station! VK5HG has also worked VT2KT for the first VK-VT-28 mc. QSO. The first 28-mc. contact between the U. S. A. and Australia occurred when VK3CP worked W6BCS April 1st at 0250 Greenwich. This was followed by another contact between W6BCS and VK3PM. Only forty watts input were used at VK3CP and W6BCS! On April 7th both VK3PM and VK3CP heard W9EF (at 6:25 p.m. CST) and it is thought that this is the longest distance yet recorded for either transmission or reception on this frequency. PY1AA has worked two-way with LU2AA and he also reports hearing W2WS on April 7th. K6EHA is working on 28 mc. also, and has been heard by VK3BK.

VK3CP gives us the following list of 28 mc. calls heard (by radio via W9EF): VK4BB VK3WG VK3PM VK3OT VK3MY VK3LP VK3KS VK3KB VK3HR VK3DC VK3BQ VK5HG VK6SA ZL2AC ZL1FT ZL1AN ZL1AO W9EF W6XQ W6JU W6TS W6BCS J1TX KLL HJO WIY WIZ VK3CP; also says, "The first two week-ends in April were filled with QSOs and tests with ZL and VK. It was determined that it was possible for us to hold two-way communication with ZL for eight consecutive hours. NKF was QSA3 to QSA5 from 2040 to 2120 Greenwich. My antenna is three times full wave for 10.4 meters. Am now trying a half wave horizontal antenna with reflectors."

PY1AA ran a 28,850-kc. test with W9EF on April 9th from 2000 to 2100 Greenwich, and obtained solid copy on W9EF's signal (QSA4 to QSA5) on every test transmitted. Although PY1AA's frequency was known W9EF was unable to hear him. It was cloudy and overcast in Hammond at the time.

OH2NM had the pleasure of making a Europe-Asia contact when he worked VT2KT on February 10th at 1150 Greenwich on 28mc. OH2NM was reported QSA5 in India, and VT2KT was QSA2–QSA3. OH2NM used 80 watts input to a Philips Z3 tube with an aperiodic antenna about 40 meters long. VT2KT used 9 watts input. OH2NM has heard FSCT, FM8RIT and G6HP on 28 mc., and worked two of these latter stations. VT2KT logged OH2NAP on February 10th at 0935 Greenwich Q2A5. G5YK is now believed to have made the first contact between England and India (1130 Greenwich, February 10th), this two-way work resulting from a schedule arranged by Rodman of VT2KT prior to his departure from England in January. G5YK's second contact with VT2KT on February 24th was somewhat more satisfactory than this first QSO with improved signal strengths in both directions.

D4UAH is anxious to establish communication with the U. S. A. on 28 mc. and reports hearing W2JN and W4NH with excellent audibility. D4UAH is believed to have established the first 28-mc. communication between Germany and South Africa when he worked ZS5C on 10.38 meters between 1600 and 1640 GCT with an input of about 25 watts.

K1CM has had good two-way communication with both Australia and Japan on ten meters. VE2AC reports that conditions in this band were rather poor during late March and early April. His signals were reported heard at ef8AAP and by a station in Norway.

W2GP and W9ECZ pass along the request of several Australian stations that U. S. A. amateurs listen on 28 mc. from 0100 to 0300 GCT Sundays (8 to 10 p.m. EST Saturdays) for a bunch of VK stations working on 28 mc. A number of west coast QSOs have already been made and as many stations as possible should look over the band at this time. W6BCS has been working on 28 mc. since March 31st and in two weeks he heard VK3CP, VK3MY, VK3PM, ZL1AO, and ZL1FT, having good two way QSOs with VK3CP and VK3PM as early as 6:30 p.m. PST. Unfortunately W6BCS' operator left for his ninth district address in mid-April, so there will be no more 28 mc. reports from him for a time. W4BL has been worked in addition to the Australian contacts and in spite of "Ford automobile" ignition QRM. PY1AA has heard W2ALW. W9EVC has heard a number of weak 28 mc. signals and received a number of good reports from all along the Atlantic coast, also finding that the closest station he could work successfully was W8ZG. W9DKM has been received on this frequency but weaker than the east coast stations. An automatic key is now in process of construction, after which tests on 28 mc. will be run for extended periods.

Tufts College (W1XAW-W1KN) is now equipped to undertake transmission experiments on 28,000 kc. on regular night and day schedules using a 500-watt transmitter. Also definite attempt at two-way contacts with other stations equipped for 28-mc. work will be made.

The 28-mc. tests arranged by the Radio Society of Great Britain were held during one of the worst periods for 28-mc. work which has been recorded since the opening of the 28-mc. band. Few two-way contacts were made. However, a number of signals were logged in the short period when signals were good. Brief reports from participating stations follow:

G2CX: (heard) W2ACN W2JN W1ZZ W2AYR W2ALW W2BVG W9DHK
(QSO) W2AYR
GI6YW: (heard) FM8RIT W2BHQ W2JN W2BVG
GI5WD: (heard) FM8RIT W2ABC W2JN W2BHQ
G6LL: (heard) FVM2 W2BOK W2JN W2BHQ W9DHK W1ZZ W3ADY NKF W2XAW
(QSO) W2BHQ W2JN
G6WN: (heard) W2ACN W2JN NKF W2XAW
BRS19O: (heard) W2ALW W2AYR W1ZZ W2BVG W2JN W2ACN W1RY W5YG W2BHQ W9DHK W1BAE ZS5C W1AQD NKF
BRS36: (heard) W2JN W2ACN W2AYR W2ALW W2BHQ
BRS25: (heard) W2JN W2AYR W2ACN W2BOK W1ZZ W2ALW W2BHQ W3ADM W2BVG W9DHK NKF W2WI
G5YK: (heard) EU2FA ?2AI W1BAE W1ZZ
(QSO) W2JN
EI7C: (heard) OMJC? W2JN W2BHQ W2BVG
(QSO) W2JN
G6DH: (heard) FVMZ W4NH W2JN W2ACN W2BOK W2AYR W2BHQ W2ALW W3ADM W1ZZ W1AQD W1BAE
OK2YD: (heard) RGV W2JN W1BW W1XAM W8DAS LSF DFI EI7C RWX W8AXA W1CMF W1Z WQA (harmonics).

TRAFFIC BRIEFS

"LJ" of WSBS (the Yacht *Carnegie*, 9045 kc.) expresses the opinion that there ought to be a regulation against a fellow's sitting on the key by the half hour while watching the meters and having a smoke, and he doubts if the average run of ham signals have improved much in either quality or steadiness yet. If something really happened to these signals, it would appear that tuning and testing was in progress, but nine times out of ten the signals are steady. "LJ" also suggests that all this heavy tuning and adjusting should be carried out during the daytime, and not in the busiest operating hours, evenings. If the sets were properly tuned up, as in any good fixed station, all that would be necessary during rush hours would be a preliminary warming up requiring not more than a half minute. Then, too, these long drawn out talks with full words and six unnecessary calls do no good and lots of harm. The International Q Code and miscellaneous abbreviations were designed to minimize QRM and conserve operating time. So why not always make the conversation snappy by using plenty of abbreviations, and the internationally understood abbreviations whenever and wherever possible! "LJ" says you should all listen to the ole U. S. A. bands from down in the South Seas — and then improve those operating practises!

This flopping all over the band and "tuning up" during the evening operating hours is a "ham" operating trick and no mistake. Why not pick a frequency where the equipment works best and stick to it. The "best" stations use known frequencies and keep schedules consistently — and their ops always know where to find each other for the most efficient handling of routine traffic work.

POUNDING BRASS WITH PLEASURE

QSP?

By Vincent Berry*

Mr. Berry wins second prize in our article contest this month. His contribution again emphasizes the importance of "deliveries" and the desirability of originating only good and worthwhile messages. — EDITOR.

DID you ever stop and think about amateur radio from a different view point than that of an amateur? Try it once and maybe you will have a different point of view from an amateur standpoint.

You see different things that don't occur to you when you are pounding brass. Take for instance the distance you can cover when you work another station. A thousand miles or two does not mean much to you, but to the average person the chance to talk with someone a thousand miles or more away is the thrill of a lifetime. Did you ever listen to the voices of people to whom you have QSP'd messages and noticed how glad they were to get news from their friends or relatives? The tone of their very voice is enough to prove to any amateur that he has indeed done someone a great favor. More than once I have QSP'd via the telephone and let me tell you, the thanks that they give you are not the kind that the hams sling around after they get a report on their sigs. It is an honest to gosh thanks — almost "88!" Often I have given a message over the phone and then sent the answer to the waiting station at the other end and be would deliver it in a few minutes. Do you think anybody was sorry that we made such short work of a message over a distance of a thousand miles? I don't; I enjoyed it immensely, and I am sure that the other operators got some pleasure out of it.

By checking, I have discovered that about three messages, out of over fifty sent, have been delivered. This is a rather low percentage and so I suppose there are some stations with only a hook for originated messages and a stove for those that should be delivered. I am inclined to believe that these are far in the minority and that I had just hit a streak of bad luck.

If you haven't the time or don't feel like handling traffic, for goodness sakes, don't take any and if you do, don't make the stove your mail-box. One cent for a post card will do the trick and you have done someone a kindness besides.

Let's cut out the rubber-stamp messages and have a few real messages. What we want is quality, not quantity.

* W6DHM, 4544 Toland Way, Los Angeles, Calif.

Don'ts for DX

By Frank E. Dailey*

In March QST, page 62, the Communications Department invited contributions on every phase of amateur communication activity, offering prizes for the best article selected from those submitted during each month of 1929. A wide variety of subjects on which articles would be welcomed were suggested in the original announcement. In addition to these articles receiving a good position in QST, the authors whose articles appear to have the greatest value of those sent in for consideration each month have the choice of (1) a copy of the Radio Amateurs' Handbook bound in algerian, (2) six pads of A.R.R.L. message blanks, or (3) 500 A.R.R.L. lot sheets.

The prize winning article by Mr. Dailey asks for more use of plain common sense in attempting to "work DX" and there is much food for thought in what he has to say. Improved operating procedure will better conditions in all our bands. With but a single CX810 the author has worked amateurs in fourteen different foreign countries and in every state in the U. S. A. from a location in the central part of the country — and not one of these on his CQ! So we think he has earned a right to be heard. Quite possibly if it is thoroughly demonstrated that amateurs fail to coöperate effectively in these operating matters, more legislation, regulation, and supervision will be invoked in the future to improve conditions. We sincerely hope that satisfactory remedies can be found in a higher degree of organization and coöperation so that the more drastic measures can be postponed. What do you think about it, fellows? — EDITOR.

FOR the past several years there has been article upon article printed in *QST* about the proper and improper methods of operating an amateur station, especially as regards calling "CQ," broad sloppy notes and holding one's key down for minutes at a time, not to mention the many other thoughtless or deliberate discourtesies of which so many amateurs are at one time or another guilty.

Today we seem to be in as bad, if not in worse, disorder than ever before. One has only to listen for a short time on any of our so-called "international" day or night bands to be convinced of this fact.

Since August of last year, I have been attempting to keep various DX skeds, especially with Australia during the morning hours, and since January 1st, when VK stations moved within our new band limits, it has been all but impossible to hear anyone outside the country, due, about ninety percent, to the tendency of so many W operators to the practice of blatting "CQ" or "CQ-DX" (incidentally blotting out the only DX which could otherwise be heard) and the chumps who are forever adjusting their transmitters, usually with a book on the key and a note like a sawmill.

If the above named pests were only restricted in their activities, it would become possible to hear and work these DX stations without serious difficulty, but under present conditions, it is next to impossible. No amount of receiver construction will or can overcome the handicap that these fellows impose on their brother "hams" by their thoughtlessness or indifference.

Surely it will not be long before it will become a punishable offense to call "CQ" from this country after one hour prior to sunset and for at least one hour after sunrise. If these bands are international bands, why clutter the air with such trash and make international QSO impossible? There can be plenty of inter-U. S. A. QSO during daylight hours if 40 and 20 meters is to be used and the traffic handler still has the 80 meter band for this work after dark.

It would seem that even the most dense among U. S. A.

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amateurs would have long since realized that foreign amateurs do *not* listen for "CQ's" from this country, but call *their own* "CQ" and listen for replies. Doesn't it stand to reason that this is the most sensible procedure for them? Put yourself in the foreigner's place. Why call any one particular W station (unless on sked) when a CQ-W will bring forth scores upon scores of replies?

If these fellows who crave "DX" so badly as to make that same impossible for all of us would desist and *listen* for DX and then *call* the other fellow, what a heaven these bands of ours would become, in comparison to the present conditions.

I am in receipt of a letter from ZL1FW in which he says: "The QRM question down this way is not so acute as we first thought it would be. Only occasionally am I troubled with QRM from N. Z. stations. You chaps over there blot out all DX and also blot out one another. There's not much of the long-winded CQing here. It's been cut down a lot lately."

How about it, fellows? Let's pull for legislation that will exclude such sloppy operating methods from our "DX" bands. It should be a punishable offense to call "CQ" or "Test" from this country during the times these bands are considered as being *international*.

ARMY AMATEUR NOTES

We are pleased to announce that Lawrence J. Dunn, W2CLA, former Director of the A.R.R.L. for the Hudson Division, has been commissioned Chief Amateur Radio Aide to the Chief Signal Officer of the Signal Corps of the United States Army.

SEVENTH CORPS AREA: W9ABK is the N.C.S. with W9BCT for alternate.

SECOND CORPS AREA: David Talley, W2PF, has been appointed Radio Aide to the Signal Officer of this Corps Area. In effect this is a continuation of Mr. Talley's

W2CLA RECEIVES HIS APPOINTMENT

former duties in the old scheme of affiliation, and we are pleased to learn of his retention in the former capacity, which he has filled so well in the past.

Western New York Net: W8AKH is acting as N.C.S. in

place of W8DME at present. W8BFG and W8BHC are continued as the active stations in this net.

Eastern New York Net: On account of business reasons W2KR, N.C.S., has been unable to keep all schedules during the past month, and W2BPQ and W2ANV have acted as N.C.S. during the schedules.

New Jersey Net: W3ATJ and W3OH didn't miss a single schedule during the month. W2AT and W3ZI were active, also. W2AOS, the N.C.S., installed a new "high C" Hartley. W3MI and W3ASG are new Army Amateur stations in the New Jersey State Net.

W2SC, the Corps Area Net Control Station located on Bedloe's Island in New York Harbor, is at the present time temporarily off the air because of rebuilding operations. In the very near future the station will be back on the air with the usual pep.

Official Broadcasting Stations

CHANGES AND ADDITIONS

(Local Standard Time)

W4ACC, Mon., Sat., 12:30 and 6:30 p.m.; W4AEF (7135 kc.), Mon., Wed., Sat., 3 p.m., Tues., Sat. (14,300 kc.), 3:30 and 7:30 p.m.; W6CHA (7000-kc. band), Tues., Thurs., 5 p.m.

ELECTION NOTICES

To all A.R.R.L. Members residing in the Sections listed below:

(The list gives the Sections, closing date for receipt of nominating petitions for Section Manager, the name of the present incumbent and the date of expiration of his term of office.) This notice supersedes previous notices.

In cases where no valid nominating petitions have been received from A.R.R.L. members residing in the different Sections in response to our previous notices, the closing dates for receipt of nominating petitions are set ahead to the dates given herewith. In the absence of nominating petitions from Members of a Section, the present incumbent continues to hold his official position and carry on the work of the Section subject, of course, to the filing of proper nominating petitions and the holding of an election by ballot or as may be necessary. Petitions must be in Hartford on or before noon of the dates specified, all of which are 1929.

Section	*Closing date*	*Present SCM*	*Present term of office ends*
Western N. Y.	July 15	C. S. Taylor	July 1, 1928
Nevada	July 15	C. B. Newcombe	Sept. 15, 1928
Philippines	June 15	M. I. Felizardo (acting)	Jan. 3, 1929
Virginia	July 15	J. F. Wohlford	Dec. 2, 1928
Arizona	July 15	D. B. Lamb	Jan. 3, 1929
San Diego	July 15	G. A. Sears	Feb. 2, 1929
Eastern Pa.	July 15	J. B. Morgan (resigned)	Mar. 7, 1930
Md.-Del.-D. of C.	July 15	H. H. Layton (resigned)	Jan. 7, 1930

Due to the resignation of Mr. J. B. Morgan, W3QP, in the Eastern Pa. Section of the Atlantic Division and of Mr. H. H. Layton, W3AIS, in the Maryland-Delaware-District of Columbia Section of the Atlantic Division, effective at once, nominating petitions are hereby solicited for the office of Section Communications Manager in these sections and the closing dates for receipt of nominations at A.R.R.L. Headquarters in Hartford are herewith specified as noon, July 15, 1929.

CANADA

Nominating petitions for Section Managers in Canada should be addressed to Canadian General Manager A. H. K. Russell, VE9AL, 5 Mail Building, Toronto, Ontario. To be valid, petitions must be filed with him on or before the closing dates named.

British Columbia	July 15, 1929	E. S. Brooks	Dec. 2, 1928
Saskatchewan	July 15, 1929	W. J. Pickering	Dec. 2, 1928

To all A.R.R.L. Members residing in the Sections listed:

1. You are hereby notified that an election for an A.R.R.L. Section Communications Manager, for the next two year term of office is about to be held in each of these

Sections in accordance with the provisions of By-laws, 5, 6, 7 and 8.

2. The elections will take place in the different Sections immediately after the closing date for receipt of nominating petitions as given opposite the different Sections. The Ballots mailed from Headquarters will list the names of all eligible candidates nominated for the position by A.R.R.L. members residing in the Sections concerned.

3. Nominating petitions from the Sections named are hereby solicited. Five or more A.R.R.L. members residing in any Section have the privilege of nominating any member of the League in their Section as candidate for Section Manager. The following form for nomination is suggested.

(Place and date)

Communications Manager, A.R.R.L.
1711 Park St., Hartford, Conn.

We, the undersigned members of the A.R.R.L. residing in the..... Section of the..... Division hereby nominate..... as candidate for Section Communications Manager for this Section for the next two-year term of office.

(Five or more signatures of A.R.R.L. members are required.)

The candidate and five or more signers *must* be League members in good standing or the petition will be thrown out as invalid. The complete name, address, and station call of the candidate should be included. All such petitions must be filed at the headquarters office of the League in Hartford, Conn., by noon of the closing date given for receipt of nominating petitions. There is no limit on the number of petitions that may be filed, but no member shall sign more than one such petition.

4. Members are urged to take initiative immediately, filing petitions for the officials of each Section listed above. This is your opportunity to put the man of your choice in office to carry on the work of the organization in your Section.

— F. E. Handy, Communications Manager.

ELECTION RESULTS

Valid petitions nominating a single candidate as Section Manager were filed in a number of Sections on or before the closing dates that had been announced for receipt of such petitions. As provided by our Constitution and By-laws, when but one candidate is named in one or more valid nominating petitions, this candidate shall be declared elected. Accordingly, election certificates have been mailed to the following officials:

Section	*Address*	*Two-year term begins*
Oregon	Wilbur S. Claypool, W7UN, 943 E. 30th St., S. E., Portland	June 2,1929
Sacramento Valley	Everett Davies, W6DON, 1234 J St., Sacramento, Calif.	May 6, 1929

In the Main Section of the New England Division, Mr. Harold G. Riley, W1AUR, Mr. John Singleton, W1CDX, and Mr. Grover C. Brown, W1AQL, were nominated. Mr. Singleton and Mr. Brown received 17 votes and Mr. Riley, 9. Therefore, another election must be held enabling the Section to choose between the two candidates, who are tied. Ballots are being mailed at the present time.

In the Los Angeles Section of the Pacific Division, Mr. D. C. Wallace, W6AM, 279 Molino Ave., Long Beach, Calif., and Mr. Melvin S. Wood, W6AVJ-W6DKY, Box 278, Gardena, Calif., were nominated. Election results: Mr. Wallace, 109; Mr. Wood, 69. Mr. Wallace, therefore, has been declared elected, his term of office beginning April 29, 1929.

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W7BB of Seattle reports working AC5GO on about 7025 kc. Many will remember this call as being that of old Canadian 5GO, Earl Chang of Vancouver. His present location is Shanghai, and his signal may be heard on the above frequency with an ICW note. W7BB is planning to keep a schedule with him.

BRASS POUNDERS' LEAGUE

Call	Orig.	Del.	Rel.	Total
W1MK	100	198	760	1038
W4AEF	58	25	642	725
K1HR	220	114	378	712
W4ACC	20	11	614	645
W6AKW	30	4	518	552
W9FLG	104	104	330	538
W6EEO	82	256	186	524
W6AD	84	201	236	521
W6ADD	500	—	—	500
W3ZF	7	85	352	444
W9ESL	235	67	106	408
W2SC	38	67	296	401
W1CQ	57	11	308	376
W9DLD	22	20	296	338
W6AVJ	201	33	98	332
KDV5	273	49	4	326
W9COS	83	160	82	325
W6DKV	221	30	70	321
W6CIH	32	14	262	308
W6IP	68	71	162	301
W1AQD	75	34	190	299
W5AQY	169	59	62	290
W6UJ	91	142	24	257
W2BFQ	41	34	176	251
W9ERU	10	41	192	243
W1CGX	22	21	186	229
W6CHA	41	30	156	227
W2BGO	74	28	124	226
W9FS	7	5	214	226
W9DXZ	23	75	128	226
W1ACH	58	54	110	222
W1AUS	21	32	168	221
W8CMB	12	25	183	220
W5WF	12	15	190	217
W9BCA	15	41	159	215
W6DNS	45	17	131	213
W1AUR	17	15	181	213
W8CNO	32	22	158	212
W6BTX-6EIW	8	18	185	211
W4AQ	100	40	70	210
W9GHI	57	32	117	206
W8GZ	8	14	184	206
W4RB	131	62	12	205
W6ETA	82	12	110	204
W6DON	26	14	172	202
W6ALX	15	52	110	177
W6EH	45	63	66	174
W6AMM	70	85	6	161
W4AHQ	39	67	52	158
W9LN	62	51	42	155
W4IE	35	52	67	154
W6BVY	62	92	—	154
W1ACA	20	60	28	150
W6ERK	57	55	26	138
W8BMJ	24	51	54	129
W5ASM	36	75	16	127
W3AKB	13	74	36	123
W6BCN	36	81	3	120
W8DSP	26	50	42	118
W4AII	22	57	12	113
W4AGY	23	52	36	111
W3ALF	6	73	30	109
W1KY	20	60	28	108
W6BYY	—	64	44	108
W8OA	51	52	4	107
W2QU	38	67	—	105
W6HM	22	66	—	88
W1KH	22	57	4	83

The several amateur stations reponsible for the best traffic work — the ones that are "setting the pace" in worthwhile traffic handling — are listed right up near the top of our B.P.L., the figures giving the exact standing of each station accurately.

All these stations appearing in the Brass Pounders' League are noted for their consistent schedule-keeping and dependable message-handling work in amateur radio. Special credit should be given to the following stations (in the order listed) responsible for *over one hundred deliveries* in the message month: W6EEO, W6AD, W1MK, W9COS, W6UJ, K1HR, W9FLG.

Deliveries count! A total of 200 or more bona fide messages handled and counted in accordance with A.R.R.L. practice, or just 50 or more *deliveries* will put you in line for a place in the B.P.L. Why not make more schedules with the reliable stations you hear and take steps to handle the traffic that will qualify *you* for B.P.L. membership also!

High Grade Stations — High Quality Signals

EACH month Section Managers and Route Managers select the outstanding stations which are considered the "best" consistently operated stations in each band. Those having the clearest of notes, those sharpest tuning, and the steadiest signals are reported for *QST* mention.

Really *good* signals with the requisite sharpness, steadiness, and clarity of tone which constitute our present-day standards of perfection are not too numerous if we may judge from all reports. To "make" our list it is necessary that the signals be heard *several different times* and if possible reported from *more than one* source as proof of the *consistency* of the station and its *regular* use of a good signal. Of course stations with perfectly good signals must do a certain amount of operating to be heard and reported. Our list thus credits both *outstandingly good* signals and consistency or reliability. No stations with choppers or uncalled-for broadness can qualify, and the attention of observers has been called to this fact so that even the prettiest of signals will not be reported if guilty of being broad and inconsiderate of others.

Operators of stations listed in our reports consistently month after month should be well satisfied with their performance and for good reason. Our column will grow, too, especially if you help your SCM and RM in deciding on their recommendations to *QST* by submitting small lists of the outstandingly good signals and reliable consistent operators that you hear. Other stations not in our present list will no doubt be able to qualify shortly. Separate reports from each Section in the U. S. A. and Canada will place more emphasis on good station PERFORMANCE — less emphasis on a small DX record accomplished perhaps with brute power and wabbly signals. Since our reports come from all over the country they are equally fair to all station owners. This month our list is too long to permit publication of reports from each of the twenty-four Sections contributing to the success of this column. From all the reports received we have compiled an alphabetical summary which credits the stations reported more than once by separate mention. The future of our column depends both on your cooperation in submitting accurate reports and on our new space requirements for this portion of *QST*. Comments on how you would prefer to see the reports modified to do the greatest good would be appreciated. Separate lists should be turned in for *each* different amateur band. Detailed lists of high-quality signals and well-operated stations working on the several amateur bands follow:

Reported by five or more observers:

(3500 kc.) W1MK, W2SC.

(7000 kc.) W1MK.

Reported by four observers:

(3500 kc.) W8ANX, W8EB, W8UK, W9APG, W9DLD, W9DSC, W9DXZ.

(7000 kc.) W9CVN.

Reported by three observers:

(3500 kc.) W3SN, W8ZZ, W9CYQ.

(7000 kc.) W3ANH, W4MI, W7EK, W8CSS, W8LT, W9ARA, KFR5.

Reported by two observers:

(3500 kc.) W1KL, W3HL, W3ZF, W8WO, W8XE, W9COS, W9EK, W9FYC, W9YI.

(7000 kc.) W4LI, W5AAK, W5JD, W5QJ, W7ACY, W8BEK, W8CEX, W8DAQ, W8FZ, W8GZ, W9CET, W9CTW, W9DXP, W9EGU, W9FQS.

(14,000 kc.) W6UF.

Reported from one source:

(3500 kc.) W1ACH, W1AFD, W1ALE, W1AQD, W1AQL, W1ASD, W1ATJ, W1ATO, W1AUR, W1BIG, W1BST, W1CGR, W1IP, W1IX, W1TA, W1UN, W1WV, W2AIZ, W2ANG, W2AOR, W3AQR, W3BO, W4ACK, W4AEO, W4AII, W4AJH, W4HJ, W4JO, W4PM, W4SE, W8ARC, W8AVK, W8BXK, W8BYN, W8CDC, W8CEP, W8CKA, W8CMP, W8CNO, W8CRI, W8CVQ, W8DAQ, W8DED, W8DKX, W8DME, W8HB, W8NU, W8PY, W9AZD, W9ZAR, W9BBT, W9BKJ, W9BZO, W9CWQ, W9DCD, W9DVR, W9DVS, W9DEH, W9EI, W9EXN, W9FAG, W9FHV, W9GBF, W9GCP, W9IV.

(7000 kc.) W1ACP, W1AXX, W1BDI, W1SZ, W1WV, W2ALG, W2AOJ, W2BLX, W2FL, W2FM, W2RS, W2UK, W3AJT, W3AWS, W3CKL, W4ACI, W4ACK, W4ADF, W4ADN, W4AEJ, W4AEO, W4AEW, W4AGG, W4AII, W4AIW, W4AJM, W4ARQ, W4CZ, W4EI, W4LI, W4LK, W4LL, W4MX, W4NF, W4PF, W4PK, W4PP, W4RB, W4SI, W4SP, W4TO, W4VB, W4WN, W4ZC, W4ZP, W4ZZC, W5ACH, W5AFX, W5AHB, W5APG, W5ASM, W5BBX, W5BCZ, W5BF, W5BQ, W5EB, W5PG, W5RD, W6AM, W6AMM, W6ATU, W6BLI, W6BTX, W6BYB, W6CEK, W6CYQ, K6CLJ, W6CUH, W6DCA, W6DFS, W6DPF, W6DPR, W6DWH, W6DYE, W6EAR, W6EAU, W6EHI, W6EMG, W6EPC, W6EQA, W6HB, W6RE, W6SC, W7AAT, W7AIJ, W7AIK, W7AIY, W7HR, W7TS, W7YA, W8ALU, W8ANH, W8APN, W8BAU, W8BTI, W8CAU, W8CFT, W8CKL, W8CLQ, W8CRO, W8DII, W8NU, W8VS, W8XE, W9ACU, W9ACZ, W9AMA, W9AYU, W9BG, W9BPM, W9BRC, W9BTG, W9BZO, W9CGA, W9CIG, W9COS, W9CXX, W9DBJ, W9DEF, W9DGR, W9DNC, W9DND, W9DWW, W9EHO, W9EK, W9ELL, W9ERU, W9EZO, W9FTY, W9FYY, W9GAC, W9GFT, W9GHV, W9GTY, W9GVC, W9KDL, W9OT, W9SN, W9UY, VE2AP, VE3JK, VE4GK, VE5CP, VE5KD, ZL4AE, ON4EA, EAR62, K4AAN, KDV5, WSQ.

(14,000 kc.) W1ACK, W1AEF, W1ALB, W1AQD, W1BKR, W1BOD, W1CMX, W1ZD, W2DAB, W2FL, W3ATJ, W4ACS, W4AEF, W4AII, W4UV, W8OF, W9ASL, W9BPM, W9DGR, W9DSC, VE1BR, VE1BY, F8AAP, F8JF, F8YZP.

Best quality phones (good modulation, low degree of frequency modulation):

W1BQS, W8AYL, W8LT, W8RD, W8WO, W9FKE.

Well operated stations: W1BIG, W1IP, W1IX, W1KL, W1LM, W1TA, W1UE, W1UN, W2ANG, W8AKE, W8DAQ, W8FZ, W8GZ, W8HB, W8UK, W8VS, W9BRC, W9CYQ, W9DSC, W9DXZ.

EXPEDITIONS — WIDC

Ffoulkes of W4LK is a radioman on the yacht *Abacena* now on an extended cruise through the West Indies. It is quite possible that the *Abacena* will make a trip around the world in the near future. The *Abacena* is an auxiliary schooner carrying high frequency radio equipment and licensed as a "limited commercial" on the following frequencies under the call signal W1DC: 12,340, 8230, 5525, 3436, 500 and 425 kc. At present the 8230-kc. frequency is the main working frequency. W1DC uses a 50-watt T. P. T. G. transmitter with an 852 along for a spare, power being obtained from a 32-1000-volt dynamotor. Operator Ffoulkes says that nowadays it is hard to raise amateur stations working in our 7000-7300-kc. band as they listen on 8000 kc. less frequently. The operator of the Yacht *Ripple* (KFLF) says the same thing. There are some nice (and very worthwhile) contacts waiting for those amateurs who *do* listen on 8000 kc. or thereabouts. That's where a bunch of limited commercials and expeditions — all needing contact with amateurs' stations — work. Let's help them out with their traffic and roll up some good QSO's with the yachts and expeditions wherever they may be.

The University of Michigan — Greenland Expedition (nx1XL) — has almost daily contact with W1CKP, Mr. G. H. Pinney, South Manchester, Conn. nx1XL has also worked WFAT down at the other polar region.

On April 1st Koehler of W9BEU contacted with Byrd's base WFA, handling some traffic for St. Louis. The party receiving one message had to be convinced the whole matter was not an April Fool joke being played on him. W3KJ reported copying a CQ from WFAT, the *City of New York*, at 11:55 p. m., Sunday, April 20. On the 13th of April, W2AG worked "gl" at WFAT on 14,000 kc., the operator advising him that the Byrd Expedition will work near that frequency quite often in the future. Sgt. Oswald of GX9-W4GH also heard WFAT and WFBT both on 12,500 kc. (24-meters) at 11 p. m. CST March 24th. W6CTP reports that WFA comes

in almost any night one cares to listen (on 9000 kc.) between 9 and 11 p. m. PST, and that many times WFA is easily copied there when WHD is reported ND. W2BFF was QSO WFBT some time ago when the expedition ship was located in the Bay of Wales. As conditions were favorable some traffic was handled for the expedition.

The All-American Lyric Malaysian Expedition is now en route to the capital of Dutch Borneo, due there about June 1st. This expedition will visit remote places in Borneo. One of the objectives of the expedition will be to conduct research in tropical and equatorial radio problems. A station will be installed at the field base, call signal and frequency to be announced later.

Daily observations and measurements on signal strength of certain commercial and amateur stations over a wide frequency range will be taken at regular intervals for a year. Weather conditions over the great circle route and at transmitting and receiving stations will be compiled. Studies of general tropical conditions, fading, skip-distance, Heaviside layer height, and transmissions over the North Polar cap (which happens to lie along the great circle route between the East Coast of the U. S. A. and Borneo) will all be studied as thoroughly as possible.

We are informed that a silk flag of the American Radio Relay League will be made by the wife of the anthropologist with the expedition, and it is planned to carry this far into the jungles of Borneo and set it up at the remote places visited.

W1MK

A.R.R.L. Headquarters' Station W1MK operates on frequencies of 3575 kc. and 7150 kc. Robert B. Parmenter, "RP," is the chief operator; his fist is familiar to most of the amateur fraternity. Occasionally other members of the Headquarters' staff operate at W1MK. Their personal signs may be found in the QRA Section of *QST*.

Throughout the following schedules Eastern Standard Time will be used.

OFFICIAL AND SPECIAL BROADCASTS are sent simultaneously on 3575 kc. and 7150 kc. at the following times:

8:00 p.m.: Sun., Mon., Tues., Thurs., and Fri.
10:00 p.m.: Mon. and Fri.
12:00 p.m. (midnight): Sun., Tues., and Thurs.

GENERAL OPERATION periods have been arranged to allow every one a chance to communicate with A.R.R.L. Headquarters. These general periods have been arranged so that they usually follow an *official broadcast*. They are listed under the two headings of 3500 kc. and 7000 kc.; to indicate whether the watch is devoted to listening on the 80-meter band or to the 40-meter band.

3500 kc.:

8:10 p.m. to 9:00 p.m. on Sun., Mon., Tues., Thurs., and Fri.

10:00 p.m. to 11:00 p.m. on Tues. and Thurs. (No OBC sent before these periods.)

12:00 p.m. to 1:00 a.m. (or later) on Sunday night (Monday morning.)

7000 kc.:

10:10 p.m. to 11:00 p.m. on Sun., Mon., and Fri.

12:00 p.m. to 1:00 a.m. on the following *nights* (actually on the morning of the day following): Mon., Tues., Thurs., and Fri. (*Only* on Tues. and Thurs. does the OBC precede these periods.)

SCHEDULES are kept with the following listed stations, through any of which traffic will travel expediently to A.R.R.L. Headquarters. The frequency included within parentheses indicates the band in which each individual station keeps the schedule with W1MK:

W1ACH, Brookline, Mass. (3500): Sun. and Thurs.
W1KY, Cambridge, Mass. (3500): Mon. and Fri.
W1VB, Newtown, Conn. (3500): Tues. and Fri.
W2AOO, Brooklyn, N. Y. (3500): Mon. and Tues.
W2JF, Jersey City, N. J. (3500): Sun., Thurs., and Fri.
NJ2PA, Port Antonio, Jamaica (7000): Sun., Mon., and Fri.
W3ZS, St. David's, Pa. (3500): Mon. and Thurs.
W4AEF, Lakeland, Fla. (7000): Sun., Wed., and Fri.
W6AKW, Lancaster, Calif. (7000): Mon. and Fri.
W6CIS, San Francisco, Calif. (7000): Tues. and Sat.
W8BYN, Columbus, Ohio (3500): Mon., Tues., and Fri.
W8DSP, Syracuse, N. Y. (3500): Tues. and Thurs.
W8ZZ, Detroit, Mich. (3500): Sun. and Thurs.
W9APY, Berwyn, Ill. (3500): Tues.
W9ERU, Rockford, Ill. (7000): Sun. and Fri.
W9OX, Louisville, Ky. (3500): Sun. and Thurs.
VE9AL, Toronto, Ont. (3500): Tues. and Fri.
NNCX, Puerto Cabezas, Nicaragua (7000): Mon.

There are a number of old stand-bys that have been canceled temporarily and which will be resumed at a later date. Stations among this list are W1BIG, W2SC, W3ZF, W4RM, W8ARX, and W8BS.

TRAFFIC BRIEFS

W4IE reports that KFLF, the Yacht *Ripple*, has started on a month's trip from Sarasota, Florida, to the West Indies. Upon return the *Ripple* will leave on another trip to Maine for the summer, and after that may take a jaunt down to South America. KFLF uses a frequency of 8330 kc. and keeps several daily schedules with W4IE.

W2TY writes us from Manizales, Colombia, and says that he has found *QST* down there, 'way up in the Colombian Andes. W2TY will be remembered for his work with W8CFR in keeping in touch with GMD of the Dyott Expedition in South America.

AU7AA on 6785 kc. is a station giving the QRA of Wiktor Chionaki Telefonnia 5 Baku Azerbaijan, Asia. W4AEF worked him on March 7th and believes that his QSO is the first one from the United States with Azerbaijan.

All Philippine Islands amateur station calls now are prefixed with the letter K.

Recent floods in Alabama and Florida have called forth the coöperation of amateur radio once more. On the 15th of March the Chamber of Commerce in Pensacola, Florida, called on Ensign Francis Wm. Taylor, W4HQ, Commander of Section 2 of the Communication Reserves of the Eighth Naval District, with the news that communication was gradually being cut off between Pensacola and other cities. The coöperation of three Naval Reservists, W4VR, W4TW, and W4AKF, were secured. W4VR and W4TW served as operators on Coast Guard relief boats which worked in the flooded areas, and W4AKF stayed home and kept the ether busy. W4HQ also secured the coöperation of NAS (Pensacola) and NDZ (New Orleans). Excellent contact was maintained throughout the period of interrupted communication from Pensacola. Up in Alabama, W4AAQ was on the air and worked W4AKF in Pensacola. W4LT did his work right in the flood water by paddling his canoe through the raging waters of the Choctawhatchee River to rescue six persons marooned in a cabin.

Entries for the A.R.R.C. Cup should be sent to Chairman D. C. Wallace, W6AM. This contest, with award to the *best Sixth District amateur station*, is sponsored by the

Amateur Radio Research Club of California. Complete rules were published in the March issue of the *Oscillator*, and may be obtained by addressing W6AVJ. Entries must be received by August 1, 1929, for the contest for the year of July 1, 1928, to June 30, 1929. Requisites for eligibility are, roughly, a well-built and efficiently operated amateur station. Unless at least twenty-five entries are received, the contest will be postponed until next year.

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We got a card the other day which said: "Why do amateurs persist in using QSR instead of QSP? I worked W9 - - - the other day and he asked me to QSR. I said I didn't (which was perfectly true — no distress call had been received at my station), and then he got sore and didn't come back."

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The amateurs of Eugene, Oregon, have reduced local QRM appreciably through an agreement that all in that city shall operate on one end of the frequency band in question — which, in this case, happens to be the 7000 kc. band. FB, boys, that's coöperation!!

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W7BB of Seattle reports that the first news of the finding of Anderson, the Australian flyer who was lost while searching for the *Southern Cross*, came via VK2OW, and beat the time of the Associated Press cable by twelve hours or more.

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What would the guy with broad A.C. and the guy with fluttering D.C. do if nobody would answer him? . . . Yup — you guessed it — he wouldn't work anybody and therefore would think that something was wrong with his set. Perhaps then he would get busy and work on it until he had taken the broadness or the fluttering-ness out of his signal. The Twin City Radio Club of New Haven, Conn., and the Associated Radio Operators of Denver have recognized the forcefulness of this sort of a solution to the problem of bad signals, and have each passed resolutions that their members will not work stations whose signals are of the "broad A.C." or "fluttering D.C." type. FB, New Haven, and Denver.

Divisional Reports

ATLANTIC DIVISION

MARYLAND-DELAWARE-DIST. OF COLUMBIA — SCM, H. H. Layton, W3AIS — This will be my last report as Section Manager, as my professional duties make it necessary for me to resign. It has been a great pleasure to me during my term working with the gang. I have turned everything over to Mr. Forrest Calhoun, W3BBW, who will complete my unexpired time. Give him your support, fellows, and make this Section stand out.

Maryland: W3APX received Intercollegiate Boxing results from W8XE. W3BBW is rebuilding. W3MH had visitors.

Dist. of Columbia: W3ALF had final exams. W3BWT is rebuilding.

Delaware: W3AHJ is the call of the Wilmington Unit Naval Reserve. W3AIS is active. W3AJH pounds brass at W3AHJ with W3WJ. W3ALQ is QSO phones on 3570.

Traffic: Md: W3APX 11, W3MH 1. Del: W3AHJ 8, W3AIS 7. D. of C.: W3ALF 109, W3BWT 65.

SOUTHERN NEW JERSEY — SCM, M. J. Lotysh, W3CFG — W3CFG leads with a small total and some good DX. W3BVG is next with fair total gathered on 7000 kc. along with some DX. W3ARR has improved his total. W3ATJ promises better totals. W3BWJ is studying. W3AR has disappointing total. W3ATP had xmitter trouble. W3ARC moved to Phila. W3SJ has gone to sea and W3AOC leaves Princeton in June. W3BEI is no longer an ORS. The SCM requests every active "3" in the state to report monthly whether he holds an ORS appointment or not.

Traffic: W3CFG 52, W3BVG 42, W3ARR 33, W3ATJ 14, W3BWJ 8, W3ATP 5, W3ARN 2.

EASTERN PENNSYLVANIA — SCM, J. B. Morgan, II, W3QP — W3ZF's total is *very low* (!), as he is moving to new location. Good luck, Don and Pat. W8DHT QRMed by school. W8AWO is installing a new set. W3AKB is turning into hostess for all transient hams (Mr. Armour take note). Drop in there and see a good rig, fellows. W8CWO made his score in only one week's working. A new institution, the Scranton Amateur Radio Club, has hung out its shingle and should have the support of you fellows in that district. W3CDS says he's been sick again. W3MC has been picking 'em off the west coast with a UX210. W3AHZ has some skeds working well and hopes to have an 852 going soon. W3NF is certainly piling up the traffic. Congrats, Ed. W8VD is gathering in his, too, with success. Due to increased business activity and less time available, this is the last report you will have from me as your SCM.

Beginning next month, send your reports to Don Lusk, W3ZF, 3622 15th St., Phila., Pa., who has accepted appointment as Acting Section Manager until another election has been held. It has been a pleasure to work for and with you fellows and I appreciate your help and suggestions and regret very much that it is necessary to withdraw from the scene of action. Give Don and his successor the same confidence and backing and keep the section in the position you have put it. 73.

Traffic: W3ZF 444, W3NF 161, W3AKB 123, W8VD 45, W8CWO 34, W3AHZ32, W3CDS 16, W8AWO 9, W3MC 8, W8DHT 5.

WESTERN NEW YORK — SCM, C. S. Taylor, W8PJ — W8ABX is working on 56 mc. W8BHK and W8AFG have many schedules. W8AID and W8AHC worked a raft of foreigners. W8AK, W8ARX and W8BFG are handling traffic. W8BBP has moved into a new shack. W8BLP is at school. W8BJO and W8BLV have fine traffic reports. W8BOX, W8BMJ and W8BUJ are back again. W8CYG and W8BUP worked some good DX. W8BWU and W8OA are both on. W8CNX, W8CDB, W8CMW, W8DII and W8CKC handled some traffic. W8CSW visited W9DED-W9FBJ. W8FC, W8CVJ and W8DDL are on for traffic. W8DME has become a crystal expert. W8DQP has joined the Army net. W8DSP has some good schedules. W8KS missed the Rochester get-together.

The clubs of Buffalo and Rochester held a combined hamfest on the 13th of April in Rochester. Sixty-six hams sat down to the banquet at Hotel Seneca, and during the day some very fine talks were given by Mr. Truscott, of GE, by Mr. Gimmell, the RI, by Mr. Bauman, Pres. of the Finger Lakes club, Mr. Heiser of W8DME, Mr. Schrader of W8ADG, Mr. Miller of W8CTK, and by Mr. Hobbs, ZL1AR. The SCM wishes to thank W8ADE and W8ALY for their fine work in arranging for this meeting.

Traffic: W8ABX 2, W8AFG 2, W8AHC 24, W8AK 4, W8ARK 75, W8BBP 14, W8BCM 53, W8BFG 14, W8BHK 99, W8BJO 59, W8BLV 48, W8BMJ 129, W8BOX 22, W8BUP 3, W8BWU 54, W8CDB 113, W8CKC 9, W8CMW 52, W8CNX 82, W8CSW 16, W8CVJ 15, W8CYG 25, W8DDL 60, W8DII 44, W8DME 31, W8DQP 48, W8DSP 118, W8FC 10, W8KS 2, W8OA 107.

WESTERN PENNSYLVANIA— SCM, A. W. McAuly, W8CEO — W8CHC again leads the gang in number of messages with W8XE running a fair second. W8CFR is still after PY traffic. W8CEO has two ranges of the three range receiver working. W8DHW came through with a fair total. W8CNZ reports that WFAT is QSO hams on 14 mc. about midnight. W8ARC is busy winding RF chokes a la W8CMP. W8DKS is building a new Zepp. W8AGQ was QSO Mr. Hebert at W8CMP. W8AGQ has a sked with the SCM for Pittsburgh delivery. W8CUG handled a nice bit of traffic. W8CMP is still batting them out. W8DLG is building a fine station. W8BVG is building a row boat. W8GU was a visitor in Erie. W8BHN have the radio class in the YMCA.

The radio inspector is coming April 15th to Erie and we expect to see the list of calls go up as several club members contemplate on taking the exams. W8CZE is again in New York City. W8DOB cannot get his xmitter perking the way he wants it to.

Seven stations not ORS reported traffic this month. The SCM is glad to get your reports and the traffic figures are watched. The ATA entertained Doc. Woodruff and Treas. Hebert at a banquet this month. About 75 members were present. Angus, W9CYQ, was a visitor also on that night.

Traffic: W8XE 169, W8CFR 56, W8CEO 49, W8DHW 38, W8CNZ 17, W8ARC 9, W8DKS 9, W8AGQ 9, W8AGO 9, W8AMU 4, W8CUG 55, W8CMP 32, W8DLG 53, W8APQ 43, W8AVY 19, W8CRA 6, W8DNO 4.

ROANOKE DIVISION

WEST VIRGINIA — SCM, F. D. Reynolds, W8VZ — W8OK has another big tube. W8DPO worked some nice DX. W8DNM is married now. W8LI, W8AFB, W8DCM, ex-8BKE, W8AEG, W8SV, W8APN, W8CSR, W8CDV, W8SP, W8BPV, and W8VZ all report. W8HD has revamped his outfit and is now operating quite regularly, keeping A-A schedules and handling a bit of traffic. W8CLQ in Mannington continues to handle lots of traffic; if you are looking for a good West Va. contact, hunt him up. He is on 3500 kc. every night with a couple of UX210's. W8ACZ is rebuilding his entire station and will have a MOPA going before long. Yet it will be on 3500 kc.

Traffic: W8DPO 34, W8ACZ 61, W8HD 3, W8CLQ 70.

VIRGINIA — SCM, J. F. Wohlford, W3CA — W3EC has rebuilt his transmitter into Colpitts circuit and is getting out in fine shape. W3KR says WFBT traffic has been heavy and does not understand why all the xtal reports when using only a two-fifty in self-excited circuit. Says DX has been good with him. W3FJ claims good DX on several nights connecting with EF8ACJ and VK station. W3ALS has received appointment as Army-Amateur station and has regular sked with W3SN. DX is better with him this month. W3AAJ has been closed up and the new station, W3WS, will be operating soon from same location as WRVA. The Richmond Club seems to be going strong now and has a membership of twenty-five. W3HY expects to build a receiver to take abroad with him this summer. W3BZ reports skeds with W8CMP and W8CRI. W3BDZ has completed his power unit. W3CA has rebuilt transmitter. The SCM and W3BDZ visited W3CKL recently.

Traffic: W3EC 70, W3KR 78, W3FJ 8, W3ALS 38, W3HY 1, W3BZ 9.

NORTH CAROLINA — Report compiled at Headquarters — W4VH leads the whole section with a total that stacked up within eleven days of operating. FB! W4ZD claims several schedules and comes along for second place this month. W4AEW reports a new radio club. W4TS hauled in a few messages. W4OC still keeps the FQPM schedule. W4AFW and W4TN were on for a few. W4AB expects to be on when vacation comes.

Traffic: W4VH 85, W4ZD 58, W4AEW 41, W4TS 37, W4OC 19, W4AFW 7, W4TN 5.

ROCKY MOUNTAIN DIVISION

COLORADO — SCM, C. R. Stedman, W9CAA — W9CAA is working on all useful frequencies including 28,000 kc. W9DGJ has been busy. W9BQO has been on more. W9EUR has school QRM. W9DQV leads the whole section in traffic. W9EAM is on 3500 and 7000 kc. W9CDE uses low power on 7000 kc. W9EAE moved to Clovis, New Mexico. W9CCM is back after a few weeks off the air. W9FXW is still on the air at Boone. W9EBF is getting out good. W9BDY has moved to Greeley. W9CKN is a new ham at Greeley, also. The SCM would appreciate hearing from any other hams in the state who have not been mentioned in reports from this section. Don't be bashful, fellows. A card to W9CAA will do the trick. W9DND is having trouble with his transmitter. W9DQD, W9CSR, W9CDW, W9CGW, and W9DKM all reported.

Traffic: W9CAA 25, W9BQO 20, W9CDE 10, W9EAM 10, W9DQV 33, W9EUR 1, W9DGJ 3, W9CND 11, W9CCM 3, W9EBF 2.

UTAH-WYOMING — SCM, Parley N. James, W6BAJ — W6BTX and W6EIW take the honors this month by making the BPL. They are keeping four skeds. W6EKF was very busy at school but handled traffic anyway. At last, W6DXM finished his new transmitter and he is on regularly now. W6BUV reports by radio. W6RV handled a few with a 201A. W6BAJ has a new mercury arc. W6ATU is with us again with a 210 in a High C circuit. W6DYE was busy. W6DPO has trouble with his receiver.

Traffic: W6BTX and W6EIW 240, W6EKF 64, W6DXM 34, W6BUV 10, W6BVB 7, W6RV 4, W6BAJ 1, W6ATU 1, W6DPO 16.

SOUTHEASTERN DIVISION

ALABAMA — SCM, S. J. Bayne, W4AAQ — W4AJY has been busy at the local broadcast station. W4AX maintains a schedule with nnBCY. W4AJY is perking well now. We are sorry to learn that W4AHY has been ill. W4AIY has been experimenting. W4UV has worked all continents. W4AQ and W4AHQ lead the state in traffic, both making the BPL. W4AHQ uses a gas engine to drive his generator. W4TI and W4AIM are on deck. W4LT operates phone on the high band with splendid results. W4AHP has a new Zepp and schedules every day. W4AHR requests those interested in Army-Amateur appointments to write him at once. We have W4MY's first traffic report. W4AJR has received his ORS appointment. W4AAQ is elated over the increased activity in the section.

Traffic: W4AQ 210, W4AHQ 158, W4AAQ 115, W4AHP 101, W4AHR 100, W4AJR 50, W4AX 42, W4TI 31, W4UV 19, W4AJY 24, W4AIM 12, W4MY 9.

FLORIDA — SCM, Harvey Chafin, W4AII — W4AEF has QSO'd Asia for the sixth time in three weeks, and has a fine traffic total. W4ACC's license has expired but seemed not to affect his total. KDV5's total of 326 is being included in Florida's report this time. We hope to have you with us in the future, KDV5. The following stations have applied for ORS appointments: W4CT, W4QV, W4AFU, W4NE, W4AKQ and W4ADB. W4RB sure is handling some traffic with that UV203A. W4IE is keeping a schedule with NNINIC and is handling most of his traffic for the states. W4AII has a crystal and a 3500 kc. fone set. W4BL reports 28 mc. FB with no static. W4NE worked VK on 14 mc. W4MS is back with a fine traffic total. W4AKF did some good work during the flood. W4VR, W4TW helped by going as operators on the U. S. Coast Guard Cutters. W4MS has a new QRA, 1812 Lakeview Blvd. He is the Florida Route Manager and wants the fellows to arrange several skeds with him. W4UW is back from the sea. W4SD reports via radio. W4AGN and W4JV sit at their keys all day long. W4AKQ and W4AGY are telegraph operators at spare times. W4OZ is keeping a schedule with the yacht *Ripple*, KFLF. W4QV is a new ham. W4AFU designs QSL cards. W400 has his OBS schedules at 6:30 p.m. on Monday and Wednesday on 3500 kc. W4ZF has an idea of a chain hookup. W4PAW, a portable call of W4AII's, will be heard quite a bit this summer. W4SK has worked all U. S. districts. W4ABA is working between Miami and Panama now for the Pan-American airways. W4PAC and W4MW have just bought an airplane together and expect to take us up some day. W4IX is chief operator at the U.S.N.R. at Tampa. W4AEF has just been elected President of the Radio Club at Tampa and W4AFU, secretary and treasurer. The SCM would like very much to hear from all of the clubs in Florida. W4PK, W4GE, W4HZ, W4MF, W4BB, W4DU, W4AFF and W4SY all report. Starting May first, the SCM is offering a very valuable prize to the three stations handling the most traffic. For information, write the SCM.

Traffic: W4AEF 725, W4ACC 645, KDV5 326, W4RB 205, W4IE 154, W4AII 113, W4AGY 111, W4BL 75, W4CT 49, W4NE 43, W4MS 41, W4ADB 35, W4AGN 32, W4JV 29, W4SK 28, W4UW 27, W4BB 25, W4ACK 25, W4SD 24, W4AKQ 18, W4OZ 17, W4QV 12, W4AFU 11, W4OOS, W4ZP 7, W4HY 6, W4PAW 6, W4TK 4, W4OB 3.

GEORGIA-SOUTH CAROLINA-CUBA — Acting SCM, J. G. Cobble, W4RM — W4VP is working DX with a Belgian 500 watter. W4SI works DX. W4KL is married. W4KV leads traffic list. W4OJ will soon be on at Ft. McPherson, Ga. W4ZA is still using xtal. W4AHM is next in traffic with 26 messages. Been QSO France, Mexico and West Indies. W4AZ is experimenting with multiple tuned antenna for receiving. W4RN on 7000 kc. handles 20 messages. W4HW reports 12 messages, and some phone work. W4RM was QSO XF8ZA, St. Helena, 10 messages. Hams in S. C., Ga., Cuba, please mail your reports in to W4RM,

J. G. Cobble, Acting SCM, 1124 Mayland Circle, Atlanta, Ga.

Traffic: W4KV 29, W4AHM 26, W4RN 20, W4HW 12, W4RM 10.

NORTHWESTERN DIVISION

OREGON — SCM, R. H. Wright, W7PP — W7AHV is experimenting with fone. W7WL has a new receiver. W7IF is working his usual DX. W7AJX is busy. W7GQ says spring has come. W7UN reports 14,000 kc. FB for night transmission. W7ALM has skeds with AC7XOT, W7HN, W7LT, W7UB, W7WY and W7JV. FB, OM. W7WB will be on 3500 and 14,000 kc. using a 204A. W7TU is figuring on high power. W7ED has a 50-watt outfit. W7KH has been rebuilding KFJI. W7IF reports activity increasing in Coos Bay region. W7AIG is on 7000 kc. W7ANW is working on 3500 and 7000 kc. with 281's. W7RR is using a 210. W7AHC is leaving for the north on a cannery job. W7AAR is a new recruit in the ranks of the boiled owl. The amateurs at Eugene have reduced local QRM considerably by all agreeing to remain on the bottom half of 7000 kc.

Traffic: W7ALM 75, W7WR 57, W7ST 49, W7PL 40, W7UN 37, W7WL 35, W7IF 21, W7AMF 18, W7PE 17, W7RR 16, W7AAR 9, W7GQ 7, W7ALK 4, W7ANW 3, W7AIG 2, W7EO 2.

MONTANA — SCM, O. W. Viers, W7AAT — W7HP and W7HT keep daily skeds on 3500 kc. W7DD is increasing power. W7FL has a new vertical rain pipe antenna. W7ZU is playing with television. W7AEM has YL QRM. W7TB and W7DJ are busy. W7EL will have a surprise soon. W7AAT is now net control station for the 9th Corps Area.

Traffic: W7AAT 86, W7HP 82, W7HT 41, W7FL 29, W7DD 26.

WASHINGTON — SCM, Otto Johnson, W7FD — This month marks the departure of many brass-pounders for the "Far North." Activities are still on the increase, from all indications. Many new stations are coming on the air. Tacoma seems the most active city with W7AFO, W7KT, W7NS, W7MX, W7NA, W7APF and W7AIJ on 14 mc. and 7 mc. W7GP is on with the 250-watt xtal control rig and keeps Olympia on the map. W7ACS in Tacoma is QRW work. In Everett we find W7EK, W7PH, W7ACY, W7MW and others on. W7AOG in Bellington is QRW work. W7IU is on in Spokane. Seattle is well represented by W7LZ, W7AG, W7TX, W7VK, W7WG, W7BB and many others who are on regularly. W7OV out in the sticks is doing some good low power work. W7LI up in Port Angeles is on using a new Zepp but seems to get out in spite of the Zepp. (W7LZ, please note.) Hi. W7AF of Decatur is now signing K7AIF in Alaska. W7ALQ of Underwood will also sign a K7 call from Ketchikan for the next year or so. Woodyard of K7HL is heard on and will have lots of non commercial traffic. Ye SCM is planning a change in ORS personnel soon and many new ORS will be appointed. The SCM will also try to arrange for more time for League Communications Department work.

Traffic: W7LZ 83, W7ACY 71, W7KT 47, W7PH 46, W7UI 35, W7TX 27, W7VK 23, W7OV 25, W7WG 18, W7AF 16, W7MW 14, W7AG 14, W7GP 9, W7LI 6.

IDAHO — SCM, James L. Young, W7ACN — The new hams seem to be in the majority in Idaho now. We introduce W7AAN and W7FN, both of Boise, W7AHG of Orofino, father of W7HR (this makes a father-and-son station for Idaho), and W7AFE of Parma. Our old friend, ex-W7AFK, has applied for a new license and will be hitting the ether with a new call. W7II and W7HE have been installing a Vitaphone "talkie" outfit. W7IY reports a new Overland coupe and expects to rebuild. W7HR reports a bad case of spring fever, but tops the list anyway. W7ACP is hitting on all cylinders. W7AFE is organizing a radio club at school. Listen, gang. W7ACP suggests an Idaho convention of hams, to be held in the southwestern part of the state. What say, gang? Slip your vote to the new SCM pro tem. W7AJQ is on 7000 and 14,000 kc. and also takes a trick at the local BCL station, KGKX, in Sandpoint. School and the lambing season are keeping W7ACD pretty busy. W7YA is on regularly, and reports W7AAN and W7FN as new hams from the radio class. W7UJ from Eugene and now chief op at Idaho's largest BC station, KIDO, reports that he is getting on with a MOPA using a 7½ and a 50-watter. W7AKZ and W7HR are active. W7GU is working east just fine. A number of the Nampa High School radio students are building transmitters and will be on as soon as they get licenses. W7ACN has a brand new 7½-watt MOPA with DC power supply.

Now gang, here is some news. W7ABB will be SCM pro tem of Idaho from June until September. His name and address follows: Harold McBirney, W7ABB, 1720 Washington St., Boise, Idaho. The June report will be due to him on June 15th. Let's have every Idaho ham behind him with a good report. The Caldwell troup of the Idaho National Guard has a bunch of fellows training for radio operators, and no doubt some of them will sprout out with a ham station before we know it. The 9th Corps Area of the Army Amateur Radio Nets under the supervision of the War Department is looking for some good, RELIABLE stations in Idaho and other states to include in their relay nets.

All Idaho station owners interested in A-A work, please communicate with the SCM or with the Ninth Corps Area at the Presidio in San Francisco.

Traffic: W7HR 24, W7YA, 16, W7IY 4, W7AJQ 3, W7ACD 2, W7ACP 1.

PACIFIC DIVISION

HAWAII — SCM, F. L. Fullaway, K6CFQ — An A-A Net has been started between K6CFQ as the NCS and K6EST and K6AFF. Everyone works on 7036 kc. with break-in. It's sure nice to hear those boys working. All stations interested in this work are requested to communicate with the SCM. K6AVL handles the most traffic for the month. Skeds did it. K6CJS has three ops and lots of time. K6CFQ has been keeping skeds with xW7ES aboard the *Vigilant*. K6ENE sends in a good one. K6DJU will be leaving us soon. Aloha to him. K6EST burns out several 210's in a month to keep up his record. K6TDG keeps six skeds — one with WSBS. K6DPG is trying MOPA. K6DB still has his L. A. sked. K6ALM tried shield grid. K6AFF is going to rebuild. K6CLJ rebuilt K6EAT during the Easter vacation. K6ACW and K6EHA reported for the first time.

Traffic: K6AVL 96, K6CJS 78, K6CFQ 59, K6DJU 42, K6ENE 38, K6EST 32, K6DTG 30, K6DPG 18, K6DB 16, K6ACW 13, K6ALM 8, K6AFF 4.

SAN FRANCISCO — SCM, C. F. Bane, W6WB — W6AD leads as usual. His deliveries alone each month run well over 200 messages. Very fine work, Schmidt. W9ERK comes second with a good total. W6AC, W6FK and W6AWA are sufferers from power leaks. W6CHL and W6PW are heard occasionally. W6KJ, W6WB, W6UF and W6CZM did some good DX. W6DSS reports this month and claims new receiver FB. W6BMU and W6DZZ are rebuilding. W6DFR is net control station in this section for the Army-Amateur work. W6DBD has been appointed Radio Aide in S. F. W6CIS says his skeds with WSBS and W1MK are doing very nicely. W6WN, the new RM, says he is very anxious to hear from any of the boys, but particularly those in the northern part of the section. W6DPF contemplates grinding a crystal. W6DZQ reports a nice total this month. W6DYB is troubled by QRM in keeping his schedules. The Associated Radio Amateurs are growing in leaps and bounds, and their membership now runs over thirty members. They welcome correspondence with any other radio clubs. Address same in care of W6WB, who is president. On March 12 the hams in Bolinas combined forces and opened up a new station with the call W6BL. They plan on handling plenty of traffic and have applied for an ORS. Great stuff, men, and I wish you lots of luck.

Traffic: W6AD 521, W6ERK 138, W6CIS 78, W6DZQ 69, W6DYB 63, W6BL 37, W6DPF 25, W6BMU 24, W6DZZ 21, W6WN 19, W6DSS 10, W6AWA 12, W6WB 8.

LOS ANGELES — SCM, D. C. Wallace, W6AM — Five stations make the BPL this month — W6AKW, W6AVJ, W6DKV, W6UJ, W6CHA. W6AKW worked Guam and also kept a good bunch of skeds. W6AVJ handled messages between W9DWN and a girl who had sleeping sickness. Also some messages from Mexican families in the war zone. W6DKV had a science exhibit at high school and his portable station in operation and so had a good number

of originated messages. W6UJ has been working for an old desert rat on a "treasure finder." It seems to work up pretty good after it was balanced up. He also handled Aero Corp. of Calif. traffic for three weeks. W6CHA reports that the West Coast Experimenters Club is going strong now. For dope, write W6CHA, Secy. W6ZBJ was handicapped for about ten days on account of burning hands on gas heater. W6DIJ had a special schedule with W6DON connecting a sick mother with her son. W6CBW is getting QSA4 and five reports from Zeddies and Aussies on a 210. W6EGH has a new QRA in L. A. W6CHT, W6EFA and W6DLI are on 7000. W6ESA and W6TK have Hartley transmitters. FB. W6FT had a schedule with an expedition to Death Valley and learned some very interesting things on skip distance. W6EKE handled messages from his fraternity brothers at the SAE house. W6AM is on as usual. W6CRC, W6ETJ, W6DYL and W6DYJ send in good reports. W6BZR plans on a 3500-kc. phone set. W6ALR rebuilt his transmitter and is sending messages free for customers in company. W6EPC sends in a good report. W6CZO worked 55X. W6MA, W6DZI, W6AXE and W9EKC are keeping good skeds. W6DOW, W6AEC, W6OF and W6DSG send in good reports. W6EPH is going good on traffic. W6APW and W6BJX built screen grid receivers. W6AGR is QRW new job. W6EEB blew his 210. W6DHM burned up his transformer. W6AWY has tried 3500-kc. fone. W6BRO has his new receiver finished — all in copper. W6BVM has moved to Dinuba. W6HS is keeping his regular USDA sked. W6HT has a new 1929 transmitter. W6ASM says that the ARRC will stage the largest banquet ever thought of by the section next October. W6COT has heavy QRM from school. W6CUH built a new receiver for W6DLN. W6CZT, W6DLK, W6BTA, W6DPY, W6BGC report as usual. W6QF reports his transmitter is on 4550 kc. as W6XC. W6DNF is still getting ready for 1929.

The Amateur Radio Research Club of Los Angeles will give the next quarterly banquet just before the Pacific Division convention this fall. The Pasadena Short Wave Club holds good meetings regularly, as well as the other clubs in the section. A new club has been formed at San Bernardino.

Traffic: W6AKW 552, W6AVJ 332, W6DKV 321, W6UJ 257, W6CHA 227, W6ZBJ 192, W6DIJ 103, W6CBW 89, W6DYL 70, W6EGH 60, W6EFA 59, W6DLI 53, W6ESA 48, W6FT 45, W6TK 39, W6EKE 37, W6AM 36, W6DYJ 32, W6ETJ 29, W6BZR 28, W6ALR 24, W6EPC 24, W6CHT 23, W6CZO 22, W6EKC 20, W6AXE 18, W6CRC 18, W6BJX 17, W6OF 17, W6DSG 15, W6EPH 14, W6APW 13, W6AGR 12, W6AEC 11, W6EEB 11, W6DOW 9, W6DZI 8, W6DHM 7, W6AWY 6, W6MA 6, W6BRO 5, W6BVM 5, W6HS 4, W6HT 3, W6ASM 4, W6COT 3, W6CUH 2, W6ZZA 2, W6CZT 2.

SANTA CLARA VALLEY — SCM, F. J. Quement, W6NX — Congratulations, fellows, on the way the reports came in this month. Message handling activity this month places W6AMM, W6BVY, and W6HM in the BPL and with W6JU, W6AME, W6BHY and W6BMW all handling heavy traffic — although not quite enough to make the BPL. With W6AMM, W6BVY and W6HM all on schedule with stations across the Pacific, a large amount of difficult traffic is being cleared. W6HM has an important sked with WSBS and is handling many of their important technical messages, many of which go over 100 words. W6AME with four ops is QRV for traffic as is W6JU, the San Mateo Junior College Station. One of W6JU's skeds is with the YL, W6ETA. Hi. W6BYY with two ops is a reliable west coast contact station. W6BHY is the new president of the SCCARA. W6BMW with a new G. R. wavemeter and a couple of 866s is again on the air. W6BNH has a sked with W6BLT. W6BYH was QRW this month. W6AJZ is back on the air and W6ESW is a new ORS. W6AZS is working on aerials and reports good contact with VS3AB on 14 mc. W6BAX was WAC during one week and W6AAZ is using an 852 on 14 mc. with FB results. W6EBP is putting in an MOPA.

Traffic: W6AMM 161, W6BVY 154, W6JU 116, W6AME 113, W6BYY 108, W6HM 88, W6BHY 65, W6BMW 22, W6BNH 3, W6NX 16, W6BYH 2.

ARIZONA — Acting SCM, Russ Shortman, W6BWS — W6EH leads the state in traffic this month. He is ex-9BCJ of spark days. He says he gets a big kick out of chewing the rag with his old friends in the midwest. He also keeps W9AMA in touch with his YL, who is living in Phoenix. W6EOF got an appointment to the Army aviation school at Riverside, Calif. W6CDU will have a he-man station on the air one of these days. W6CRA is moving east. W6EFC, a non-ORS, is hitting it off in great shape. W6BJF got hold of 30 telephone condensers and is using them in his filter. He has a fine total this month. W6CCL is headed for Australia. W6BWS is getting a crystal ground up and will have a real note on the air soon. He will be on pretty consistently soon, as he will have no college work to do and has also quit all YLs. Believe it or not. W6DTU reports hearing all continents in one night on 14,000 kc. W6CDY is now an engineer at KGAR. W6EAA reports that the push-pull Hartley is still putting out a nice steady signal, and turns in a nice list of schedules and messages. W6DCQ is building a new shack. W6DIB loaned his apparatus to a broadcast station. W6DIE has a new vibroplex.

Traffic: W6EH 174, W6BJF 106, W6CDY 4, W6DTU 50, W6BWS 79, W6EFC 17, W6EAA 73.

PHILIPPINES — SCM, M. I. Felizardo, K1AU — The report this month is as usual handled by W6EEO via radio: K1HR now keeps the following schedules, as reported by Capt. A. J. Wehr: K9PB, Zamboanga, P. I., 5:15 p.m. daily; WVN, Tientsin, China, 5:30 p.m. daily; AC8ZW, Shanghai, China, 6:00 p.m. daily; OM1TB, Sumay, Guam, 7:30 p.m. daily; K1RC, Cavite, P. I., 8:00 p.m. daily; AC8AG, Shanghai, China, 9:00 p.m. on Mondays, Wednesdays and Fridays; W6EEO, Williams, Calif., 9:30 p.m. daily. Frequency of K1HR is now 7010 kc.

Traffic: K1HR 712.

EAST BAY — SCM, J. W. Frates, W6CZR — Through the excellent work of W6CTX and the Boy Scout operators under his charge, traffic took a spurt during the past month. W6CTX, who is a scoutmaster besides being an RM, set up a transmitter at the Scout Merit Badge Exposition at the Oakland Auditorium and relayed considerable traffic to other men in the section under the call of W6ADD. W6IP, CRM, was the next highest man in spite of the fact that a great deal of his time is taken up with his duties as a CPO in the Naval Reserve. W6EIB, another Naval Reserve man at Vallejo, has been keeping a sked with old K1PW. W6ALX is keeping things humming in his new shack with skeds, traffic and code instruction. W6BCN ran up a big P. I. total through his sked with K7LG. W6CGM worked in on the news of the finding of the Southern Cross when Smithy and his mates were lost in the Australian bush. W6DWI is burning up 14 mc. with DX traffic and has been keeping a sked with W6AAU on the Chilkoot at Kodiak Island, who is using a small portable under the call of W6ZZE. W6RJ is getting out better with fundamental antenna and counterpoise. W6BI has been doing Alaskan traffic exclusively through skeds with K7AER and his old standby, K7AER. W6BIW makes his bow as a traffic man this month with a sizeable total. W6SR has a 50-watter in a high C Hartley. W6CGM has a new pup for shack mascot. W6CTX slapped out some traffic. W6EDK is rebuilding his set. W6EBA has been running up the light bill calling K1HR and AC8AG. W6ZA thinks he will get a crystal soon. W6BPC is still holding that same old sked with WSBS and says WFA of Byrd Expedition rolling in in fine shape. W6BMS reports that the Chevvie is sold and that the garage is now devoted entirely to amateur radio. W6OT has been gathering traffic. W6ASJ has been up in Isleton putting in a big electrical installation. W6EJA has been on the air three weeks with a UX-210 and managed to QSO Alaska. W6EDR is building a frequency meter. W6BZU bought a crystal. W6ALV is getting ready for his annual trip to Alaska. W6IM wants a transmitter. W6EY is active. W6CMG is busy with school work. W6BUX is selling out, but he hopes not for good. W6CZR worked W6AM at Tacoma with Don using the small portable and W6CZR oping at W6CKG in his back yard. W6ARU will be on soon with a 210. W6IT is busy with plans for the tri-section hamfest as prexy of the ORC. W6GQ plans to work his son, W6CFD, at Boy Scout encampment. W6AUT, W6CZN, W6BYS and W6CUO all reported.

Traffic: W6ADD 500, W6IP 301, W6EIB 179, W6ALX 177, W6BCN 120, W6CGM 108, W6DWI 103, W6RJ 66,

W6BI 55, W6HJ 51, W6BIW 47, W6SR 29, W6CTX 25, W6EDK 22, W6EBA 22, W6ZA 21, W6BMS 16, W6BPC 16, W6OT 14, W6EJA 10, W6ASJ 6, W6BZU 4, W6EDR 4, W6ALV 3.

SACRAMENTO VALLEY — SCM, C. F. Mason, W6CBS — Traffic: W6EEO 524, W6CGJ 27, W6BDX 53, W6ETA 204, W6DYF 11, W6CIH 308, W6AFU 58, W6BYB 140, W6DON 202, W6ELC 32.

SAN DIEGO — Acting SCM, H. A. Ambler, W6EOP — Well, gang, we not only lost our SCM, W6BQ, but also our brass pounder, W6AJM. We all are surely sorry to see you both leave this section and wish you both success in your new positions. W6DNS leads in traffic this month and is trying to arrange skeds with the Philippines and Hawaii. W6BQ says that he will be off the air for an indefinite period. W6BAS is still recalibrating frequency meters. W6BVX handled a few this month. W6EOP had the pleasure of working his old friend, W9HN the other morning. It was just 19 years ago that they held their first QSO at the great distance of one mile. W6ERT handled a few this month. W6ACJ is building a new xmitter. W6EC is being heard regularly in New Zealand on 28 mc. W6BAM is also trying 28 mc. W6CNK is very QRL school. W6BGL is QRL with ranch and new house. W6BFE will be on soon. W6EPZ certainly is stepping out, has sked with K1CM and reports very good DX. W6EPF expects to get an ORS ticket soon. W6CTP will be on 14 mc. soon. W6AKZ is QRL BCL business. W6ANC and W6EPF worked Byrd.

Traffic: W6DNS 213, W6BQ 104, W6ACJ 101, W6EPZ 78, W6EC 61, W6BGL 42, W6EOP 36, W6BAM 23, W6ANC 19, W6EPF 18, W6BZD 17, W6CTP 15, W6BVX 13, W6BXI 11, W6ERT 9, W6CNK 2.

NEW ENGLAND DIVISION

CONNECTICUT — SCM, C. A. Weidenhammer, W1ZL — W1VE is the proud possessor of a new commercial ticket. W1SA handled a few at Yale. W1RP keeps four schedules with Central American stations. W1BHM and W1BJK are still on the job. W1MK states that a new receiver is in operation. W1BI-W1BQH has moved to Boston. W1OS has her outfit in operation again. A rectifier tube "went west" at W1ATG. W1AVT rejuvenated a 203A. W1BNS has a new Hudson sport roadster. W1BGC is active on 7250 kc. W1TD still has the old power leak. W1BDI has been busy with the convention, board meeting, and other things. W1AFB and W1AMG handled a few. W1AOI reports that W1ANA and W1HN are expecting to be on the air shortly. W1CKP has schedules with W4IE and NX-1XL. W1CTI was ill but now is more lively than ever. W1AMC, W1ADW and W1BOD did some nice DX work. W1PE served as pinch-hitter for W1VB while the latter was moving. W1ZL handled messages for the Naugatuck basketball team which went to Chicago. W1AJI scared up the traffic. W1APF is with the Ward Line. W1AMQ reports the formation of an amateur radio club in Milford.

Traffic: W1MK 1038, W1AMG 111, W1VE 3, W1VB 42, W1BJK 24, W1BHM 53, W1AVT 3, W1BNS 21, W1BGC 6, W1TD 43, W1BDI 146, W1AFB 53, W1PE 159, W1AMC 12, W1AOI 46, W1ADW 16, W1CTI 46, W1CKP 49, W1BOD 14, W1RP 80, W1SA 30, W1ZL 12.

RHODE ISLAND — SCM, C. N. Kraus, W1BCR — W1BLS lost his only fiver and expects to get a 210 soon. W1BLV reports his power supply dead. W1MO has his new station nearly completed and will be on 14 mc. soon. W1AWE has been QSO ON stations on 20. W1BCR was QSO KFR5. W1BCR would like to trade stamps by radio. KDV5 sent him a bunch for a starter. W1CPH is on 56 mc. with a 210 and a pair of 866s. W1AVH is also on 56 mc. with 210 and 281s. W1AGI reports working on 7000 kc. band. He is QRV to QSP.

The Radio Club of Rhode Island received notice of its affiliation with the A.R.R.L. Good coöperation is expected by the SCM from the new hams in the organization. Chester Page represented the club in the stunt contest at the convention while Miss Betty Bradshaw, treasurer, put on an entertainment "The Radio Widow" (a monologue). Hi. Good speakers and entertainment are promised. Outside hams are invited to attend. Amateurs interested in 56 mc. tests are asked to get in touch with C. N. Kraus, 92 Keene St., Providence, R. I., for skeds.

Traffic: W1BCR 67, W1BLS 38, W1AWE 3, W1BLV 3.

MAINE — SCM, Fred Best, W1BIG — Three members of the Brass Pounders' League this time, gang! Schedules and a fine corps of operators in the Pine Tree State explains the excellent results obtained along traffic lines. FB, fellows. W1AQD took all honors for high totals this month. W1AUS ran number two and now leaves for Kelly Field, Texas to learn the art of flying. W1AUR is number three with a good total. W1ATO turned in his usual fine total. W1ANH and W1AHY have been originating some excellent messages this month. W1CQS sends in a mighty nice string of messages. Mrs. W1AJC as usual trimmed the OM. W1CDX and W1COV handled a good number. W1TB, W1AJC and W1AQL handled a few. W1ASJ is doing some nice work. W1BFZ is trying hard to land that WAC certificate. W1KQ and W1BCD barely got their reports in on time.

Traffic: W1AQD 299, W1AUS 221, W1AUR 213, W1BIG 186, W1ATO 128, W1AHY 84, W1CQS 62, W1AJC 27, W1CDX 26, W1COV 18, W1AJC 9, W1AQL 8, W1TB 8, W1ANH 146, W1BFZ 5, W1KQ 26, W1BCD 45.

VERMONT — SCM, C. A. Paulette, W1IT — W1CGX leads the Section with a fine total. He plans to retain his schedules for rag-chewing. W1BDX has rebuilt and turns in a very good report this month. Say, boys, when you have your summer lay-off, will you kindly let me know on the last report card that you send in that you will be inactive and for approximately how long? W1BCK is having a good time in training school in Ga. W1IT has changed to DC plate supply now. W1AOO is using xtal control now. W1BJP is QRL orchestra. W1BDX has a complete new station. W1YD, W1BEB, W1AJG and W1FN report.

Traffic: W1CGX 229, W1AOO 102, W1IT 54, W1BDX 42, W1YD 4, W1BEB 3, W1BJP 7.

NEW HAMPSHIRE — SCM, V. W. Hodge, W1ATJ — W1IP has sworn off YLs and maybe that accounts for his fine total. W1UN sends in a fine report, even though he was away for a while. W1AUE is still hunting for a good xtal. W1BFT is building a new transmitter. W1AFD has a 1929 transmitter and note. W1AEF had to cancel his skeds on account of work but is on after 7:30 p.m. W1AUY has spring fever. W1COW is on his way home (Portland, Ore.), where he will sign W7ANZ. W1IX is still the envy of us with his nice note. W1AVJ has been busy printing QSL cards. W1MS and W1AEF have been pioneering on 28 mc. W1BST is on occasionally. W1TA is drilling with the Naval Reserve. W1MB is having a fine cruise on the U.S.S. *Bushnell*. Robert Ballard is also drilling with the Reserve, operating at W1BFT.

Traffic: W1ATJ 137, W1IP 107, W1UN 35, W1AUE 31, W1AEF 9, W1IX 6, W1AUY 2.

EASTERN MASSACHUSETTS — SCM, E. L. Battey, W1UE — W1CQ sends in another of his crack totals — 376. W1ACH, W1ACA, W1KY and W1KH make the BPL on deliveries. W1RF is busy with school work. He has been one of our best ORS for 3½ years and an "honorary discharge" is gladly granted. We have three new stations reporting this month — W1BAQ, W1RL and W1EK, exSCAE of Erie, Pa. W1EK is using a 210 with 500 volts DC. W1RL keeps a schedule with W1BAE. W1KY expects terrible QRM soon, as a frigidaire is being installed in her home. Hi. She has joined the Naval Net so finds its necessary to cancel one of her W1MK schedules. W1BZQ has to have his schedules between midnight and 2:30 a.m. and doesn't find many very anxious to keep them at that time. W1ARS is keeping four schedules. W1ALP and W1BVL are troubled with New Ford QRM. He has new receiver using AC tubes which is the berries. W1KH made the BPL on deliveries, all of which came from the Grenfell Mission. W1AKS is being put on the inactive list until next fall. W1APK is demonstrating television at the Home Progress Exposition at Hartford. Winter traffic schedules have terminated at W1LM for the summer season. W1WU will soon be ORS. W1WV had a fine trip to West Indies, March 26th to April 13th. W1UE is getting a number of inquiries from new hams just starting up, which looks good since new fellows always have plenty of pep. W1CQ had a visit from W1ARG and paid a visit to W1XV. W1ACA says Navy drills helped his traffic total. W1AAW has schedules with W8ARX, W1KQ, W1ARS and W1UE. W1ASI has made connection in the engineering department of Ratheon Company. W1ACH expects to have

a couple of 866 tubes soon. W1ALY is moving to Brant Rock for the summer, where he will be on with a 250 watter; call will be W1RV. W1AZE worked two ZL stations on March 23. W1RY asks to be put on inactive list. W1BST says ex8T9 is now located in Newburyport and is signing W1AGV.

Traffic: W1CQ 376, W1ACH 222, W1ACA 150, W1KY 108, W1KH 83, W1LM 135, W1ARS 84, W1WU 82, W1AKS 47, W1BAQ 41, W1BZQ 34, W1APK 29, W1AAW 27, W1ASI 21, W1WV 13, W1UE 11, W1EK 9, W1RL 4, W1BVL 3.

WESTERN MASSACHUSETTS — SCM, J. A. Tessmer, W1UM — W1BGM is busy with Navy net. W1BNL's new QRA is 40 Abbott St. W1AQF and W1OF went on a fishing trip to the Berkshire Hills and carried on a schedule to let the folks at home know how the fish were biting. W1AWW also was out on a fishing trip with W1OF and worked around east fine with portable. W1AWW is on every Sunday morning from 9:30 to 10:30 a.m., also most weekdays from 7:30 to 8:00 a.m. W1ADO and W1AZD are quite busy. W1BKM has a tube rectifier. W1AQM is building a receiver. W1AKZ has been on 14,000 kc. W1BSJ is rebuilding. W1BVR graduates in June. W1BWY reports that Harry Fiske of Westfield, Mass., whose old spark call was ex1BYU, is now W1DR. W1NS expects to move into his new shack soon. W1CTF, a student of the Eastern Radio Institute, will complete his course next month and will try for a commercial ticket. W1AMZ is sure to be on the air vacations and holidays. W1BKQ is rebuilding. W1BIX wants schedules south and west.

Traffic: W1ADO 13, W1EO 12, W1AZD 87, W1BKM 8, W1AQM 3, W1AKZ 5, W1BGM 32, W1BNL 1, W1AQF 8, W1NP 15, W1NS 9, W1CTF 3, W1ASU 6, W1GR 8, W1UM 2, W1BIX 39.

DELTA DIVISION

ARKANSAS — SCM, Henry E. Velte, W5ABI — W5EP has been having trouble with his rectifier. W5JK, who has been off the air for quite a while, sends in a nice report. W5HN is getting out fine with an 852. W5ARA handled some traffic with KDV5. W5BDD is going to school. W5BCZ keeps on the air regularly and handles traffic. He is using an 852 tube. W5ABI burned out some rectifier tubes. W5ZZA is busy with groceries.

Traffic: W5BCZ 53, W5EP 26, W5JK 26, W5HN 14, W5ABI 8, W5ARA 5.

MISSISSIPPI — SCM, J. W. Gullett, W5AKP — W5FQ is rebuilding. W5ANP has had his ORS cancelled on account of failure to report regularly. W5BBX raised his antenna and increased the range of his so-called 7½ watter considerably. W5AJJ burned out an M-G and W5AWP bought one. W5TX has his MOPA working fine. W5LY is using the 14,000-kc. band for the summer. W5BDE's transmitter has gone Democrat and refuses to work. True & Roy Gullett of Booneville have purchased the 100-watter that strutted its stuff at W5AKP. W5QQ turned in a good report and is one of the best operators in the state. He has schedules with the following stations: W5WF, W5ACH, W5AQY and W4KY. Gang, that is the reason he is high traffic man in Mississippi. W5AKP is constructing a new transmitter, receiver and antenna system. Take a tip from the SCM and watch the Miss. gang take the cake from the rest of the Delta Division in the near future and also keep it.

Traffic: W5QQ 101, W5AJJ 18, W5AKP 78.

LOUISIANA — SCM, M. M. Hill, W5EB — W5WF tops the list for our section by making the BPL again. FB, OM. That's the stuff of which real amateurs are made. W5ANA blew his 210. W5BDY is teaching a new fellow the ethics and practice of the ARRL. W5PG has his 310 rattling cans for Hawaii and other DX lately. He is moving to 14,000-kc. band for the summer. W5AFE has been in Chicago. W5NS is a traveling salesman. W5QJ has installed a crystal. W5LV says the OW is on regularly. W5AXS had a blow out. W5BDJ is the proud father of a new YL. W5BBO has improved his note. W5AYZ keeps the tubes ready for traffic. W5EB is ready to help any of the fellows if he can in any way do so.

Traffic: W5WF 217, W5EB 65, W5PG 39, W5BDY 15.

HUDSON DIVISION

NORTHERN NEW JERSEY — SCM, A. G. Wester, W2WR — W1AFG has moved into Ridgewood and is now W2NZ. W2WR has been on 7000 kc. W2AOS is doing fine work for the Army net as NCS. W2BDF is still working hard on WAAM's transmitter. W2CTQ is back on the air with a 1929 installation complete. W2MD and W2CJX are doing fine work. W2BY is still having antenna troubles. W2IS has YL QRM. W2CO got a card from Germany. W2AOP was servicing BCL sets.

Traffic: W2AOS 34, W2BDF 6, W2MD 102, W2CJX 32, W2BY 2, W2IS 8, W2CO 18, W2AOP 6.

NEW YORK CITY AND LONG ISLAND — V. T. Kenney, Acting SCM — Manhattan: W2SC makes the BPL two ways. W2BGO makes the BPL. W2OV will be a six during his vacation. W2AFO has rebuilt. W2BCB and W2BDJ are heard regularly on Army schedule. Bronx: W2CYX handles a goodly number. W2BPQ is very busy recruiting new Army stations. W2BBX will be W2FF in the future. W2ABS, W2SF and W2AFT are soon to be ORS. W2AET is on the air. Brooklyn: W2BFQ keeps 27 schedules weekly and rates second highest in the section. W2PF keeps the Army stations lined up. W2BO routes traffic to KFWU, Yacht Fortune, daily. W2BIV is rebuilding. W2CRB and W2AJL are on the air again. Long Island: W2AVP, RM for Long Island, maintains his schedules with all U. S. districts. W2AEU, W2TV and W2AZU are handling traffic regularly. W2AOJ is on 3750 kc. with crystal and is slated for ORS appointment. Staten Island: A delegation will be sent to Staten Island soon. We never hear any signals from there and do not even get mail, so there is a doubt as to its existence.

Traffic: Manhattan: W2SC 401, W2BGO 226, W2OV 29, W2AFO 22, W2BCB 16, W2BDJ 11. Bronx: W2CYX 42, W2BPQ 41, W2FF-2BBX 29, W2ABS 27, W2SF 33, W2AFT 7, W2AET 3. Brooklyn: W2BFQ 251, W2PF 43, W2BO 29, W2BIV 20, W2CRB 14, W2AJL 14. Long Island: W2AVP 85, W2AOJ 22, W2AEU 19, W2TV 9, W2AZU 6.

EASTERN NEW YORK — SCM, F. M. Holbrook, W2CNS — W2QU made the BPL by keeping daily schedule at 7:30 p.m. with nn1NIC, using 14 mc. and 7 mc. W2LU handled good traffic. W2ANV still handles weather reports for Montreal Air Mail and would like help from W2AUQ. W2ACD worked PXR, ship off Porto Rico. W2AXX goes on the inactive list with well-earned rest for few months. W2AYK was slowed up by bad QRN. W2BFF had W1RP an W2BOX as visitors. W2AGQ is back on the air. W2BKN is on deck. W2JE worked NR2WD for traffic. W2AUQ has a new loud-speaker YL — arrived April 1st. W2AGR's aerial blew down. W2ABY is junior op on WADT, S. S. *Guatemala* en route to Havana and San Francisco. W2MZ and W2BY, please send QRA to James Ballinger, Curdie St., Camperdown, Victoria, Australia.

Traffic: W2QU 105, W2LU 56, W2ANV 47, W2ACD 42, W2AXX 22, W2AYK 16, W2BFF 10, W2AGQ 6, W2BKN 2, W2JE 6.

MIDWEST DIVISION

IOWA — SCM, H. W. Kerr, W9DZW — W9BCA tops the list and gets back into the BPL. Our RM, W9EJQ, is runner-up with only a half-month on the air. Griffith, like others, canceled skeds on account of work, but is planning for another season. Several first reporters: Welcome to W9GCP, W9DVS, W9FDL and W9GDR. W9DRA has gone to Tennessee as operator for WSIX. W9BIJ reports five action stations at Council Bluffs — let's have more reports. W9EHR's fifty went to a needed rest. A 171A is on duty now. W9EHN still sends the OB. W9BAT reports W9EFS rejuvenating for the breeze. A new sig — W9CGN at Badger, Iowa. W9EJQ plans entire new antenna system for fall use. W9DXP has a fine sig on 7090 kc. W9FIF visited W9DZW. W9CZC and W9DZW were guests of Tri-State Amateur Radio Club at Sioux City the 4th. Fine bunch of fellows, doing more experimenting than traffic this season. W9FYC using pair of 281's in new power supply. W9EIW runs a chix hatchery, besides. W9DZW is on 7000 kc. for daily QSO at 12:45 noon. Keep the reports coming, gang!

Traffic: W9BCA 215, W9EJQ 188, W9DZW 112, W9FZO 69, W9EHR 49, W9GCP 39, W9FFD 32, W9FLK 29, W9EIW 27, W9EHN 21, W9BAT 18, W9DVS 16, W9DXP 15, W9BIJ 12, W9FDL 10, W9FYC 9, W9GDR 4, W9DPL 1.

KANSAS — SCM, J. H. Amis, W9CET — Kansas has broken all records in the history of the Section with a total for the month of 1860 messages. Very FB, gang, and keep the good work up. Again W9FLG wins the honors for traffic with a total that has never before been equaled in this section. He is now keeping 13 skeds which he claims is luck. Extra! the fone men take traffic honors, with W9ESL in second place with over 400 messages and W9GHI in third with over 200. W9CCS is 2nd op at W9GHI. W9FUG is rebuilding. W9CKV plans a new set. W9ERO is using a 112A. W9DPG is on 1750 and 3500 kc. with fone and keeps skeds on both coasts. W9HL has a receiver at the power plant. W9CFN has a new 852. W9BHR and W9SS are on 7000 kc. W9LN has been sick. W9CET is installing 866's to run a new 860. W9FTY blew his plate transformer. W9FYP is rebuilding. W9BUY claims he is on deck. W9DIH is installing vitaphone in his movie house. W9JU has moved to New Mexico. W9FLG, W9ESL and W9GHI all make the BPL. Fine work, this month, fellows, let's have more of such reports. Remember RM nite — 8 p.m. on 3500 kc.

Traffic: W9FUG 147, W9GHI 206, W9CKV 8, W9ERO 18, W9CET 142, W9DPG 62, W9BHR 47, W9HL 6, W9FLG 538, W9ESL 408, W9CFN 24, W9SS 27, W9FTY 72, W9LN 155.

NEBRASKA — SCM, C. B. Diehl, W9BYG — W9FAM leads the section this time. W9CBK comes second with another good total. W9DTH works DX on 14 mc. W9DNC has rebuilt. W9DI builds a chemical rectifier. W9BOQ works on 3500 kc. now. W9CHB has several schedules. W9BBS and W9ANZ are with us. W9CDB lost his tower. W9BQR is using low power. W9FJD and W9DVR are going strong. W9FJL sends in his first report. W9EEW has been sick.

Traffic: W9QY 14, W9DTH 2, W9DVR 4, W9FAM 42, W9DNC 16, W9DI 1, W9BOQ 6, W9CHB 19, W9BBS 2, W9FJL 10, W9CBK 40, W9FJD 8.

MISSOURI — SCM, L. B. Laizure, W9RR — W9DOE led St. Louis traffic with one sked only. W9DOE, W9DXY, W9PW and W9EAZ are candidates for commissions in the USNR. W9DZN resumed sked with W9DQN. W9GEK handles plenty of traffic. W9BEU worked WFA, taking msg for local delivery. W9DUD has school QRM. W9GHG is a new ORS. W9ECS led the section for traffic, keeping three skeds. W9ASV is building a new set. W9DZN and W9EUB are schedule-keepers. W9GBT and W9CJB did some good work. New station in Fayette, W9CNV. W9FYM has fallen heir to the most of the equipment of W9WV, who died this month. W9FVM runs code class Sunday p.m. at 4:30 CST. He was appointed district A-A station. W9AJL is new station in Mansfield. W9FBF did some visiting this month. Ex-9BCJ of Webster Groves is now W6EH in Phoenix, Ariz. W9ERM has moved to Fulton. W9AJW is on at W8BEK while away at school and wants to QSO the home gang. W9EPX has a new xtal. W9TJ moved back to the country for the summer. W9RR still on and shelf and camping at W9DQN. W9ALC is a new ORS prospect. W9ZD is experimenting as usual and QSY'd to a new job. W9BSB is rebuilding. W9DOJ was moved out of town due to change in his job with the telephone company. W9GCL, W9DKG, W9DHN, W9DMT, and W9GFV report variously with a little traffic, DX, and the usual operating troubles.

Traffic: W9DOE 51, W9DZN 43, W9GEK 31, W9BEU 12, W9DUD 3, W9GHG 1, W9ECS 166, W9ASV 21, W9EUB 18, W9GBT 21, W9CJB 11, W9DKG 5, W9DHN 7, W9DMT 5, W9FVM 4, W9FYM 2, W9GFV 2, W9FBF 4, W9DQN 16, W9ALC 9.

DAKOTA DIVISION

NORTH DAKOTA — SCM, Bert S. Warner, W9DYV — W9BVF takes the lead this month with a very nice traffic total. W9IK, W9DYV, W9DYA, W9FCA and W9CDO reported. It is with deep regret that I have to report the passing of one of the ORS members of this section, Mr. T. C. Lockrem, W9BJV, who passed away very suddenly a short time ago, and he will be very much missed in this section, as he was a friend to all the hams who knew him and always ready to assist any new ham in getting started and seeing that he made progress along the amateur lines.

Traffic: W9BVF 161, W9IK 2, W9DYV 2, W9DYA 2, W9FCA 1, W9CDO 1.

NORTHERN MINNESOTA — SCM, C. L. Jabs, W9BVH — W9EGU still keeps a nice bunch of schedules and also has a portable station on the air, using an input from one to two hundred watts, call W9GZ. W9AOK is putting up a new Zeppelin antenna. W9BBT works on 3500 and 7000 kc. W9CTW is moving. W9ADS is on with a 210. W9DPB forgot to renew his license. W9EHO has a new xtal transmitter. W9CKI and W9BVH are on 14 and 7 mc. W9CF is studying for a commercial license. W9BCT is on for A-A skeds. W9CIY called on the SCM during the month. W9EGF is op at WHDF, Calumet, Mich. The SCM is going on a trip to Washington, Oregon and California this summer and will carry a portable and would like a few schedules with stations in this section.

Traffic: W9EGU 177, W9AOK 89, W9BBT 52, W9CTW 35, W9ADS 28, W9EHO 19, W9DPB 18, W9CKI 18, W9BVH 11, W9CF 5, W9BCT 2, W9CIY 2.

SOUTH DAKOTA — SCM, Dwight M. Pasek, W9DGR — W9DGR has the largest total of all stations in the Section this month. W9EUH is on regularly with a real "29" signal. W9BBF has a UX250 outfit. W9FNN has some new mercury-vapor tubes. W9AZR–W9ESD is in line for an ORS appointment. W9DB is on 3.5 mc. on Sundays and finds the DX very good on 14 mc. W9DLY is working WFBT, WFA, CE, K4, etc. and handled press with W9CYX and W9DLY during a snowbound period. W9DWN had a sked with Los Angeles, W6AVJ, and kept a man in Pierre in daily communication with his daughter who was very ill but who has since recovered. W9DNS reports W9AJP and W9DRB active. W9DIY is on 3.5 mc. now and will be on 7 mc. by the first of May. W9CKF reports W9CHR as a new ham. A nice bunch of reports this month, gang, let's keep it up.

Traffic: W9DGR 49, W9AZR 28, W9EUH 26, W9DWN 25, W9DNS 23, W9DLY 18, W9DIY 18, W9ESD 15, W9DB 11.

SOUTHERN MINNESOTA — SCM, J. C. Pehoushek, W9EFK — The Twin City Radio Club suggests summer hamfests — what do you say, gang? Eleven ORS cancellations were made this month — all for non-reporting. I heard indirectly that W9COS employs a secretary and a somnambulist as station necessities, handled 325 and delivered 160. Boy, how do you need them both. W9DOP got QSA8 from NZ and wants to know how loud that is. W9AIR and W9BKX want all Army-Amateurs to be on 3500 every Monday night. W9AMK has a 210 on 3500. W9EFK was on 7 days this month. W9ELA still works DX with that 210. W9BTW plans crystal control. W9EOH handled a few between Minneapolis-to-home trips. W9AIR says W9BKX has the prettiest job he ever saw and he has seen lots of them. W9DBC has YL QRM. W9FCD will be in Wisconsin all summer. W9BHZ has a new antenna. W9EYL likes 3500 kc. fone. W9ERT handled a few. W9DMA reported. W9CRW (See's All — Knows All), Tommy Edmunds, of Convention Fame, got himself tangled with the tornado that demolished WRHM and suffered the loss of his trousers in the gale. Tom was cut slightly and bruised more but is FB now.

Traffic: W9COS 325, W9DOP 35, W9AIR 31, W9AMK 16, W9EFK 18, W9ELA 11, W9BTW 11, W9EOH 10, W9BKX 8, W9DBC 7, W9FCD 6, W9BHZ 4, W9ERT 3, W9EYL 6.

CENTRAL DIVISION

OHIO — SCM, H. C. Storck, W8BYN — W8CNO leads Ohio again this month 212 messages, despite trouble with rectobulbs. Certainly FB! EXTRA! W8GZ is with us again and makes the BPL with 206 msgs. FB, and keep it up, OM. W8CMB upheld traditions in gallant style. W8CKI expects to go to 7000 kc. with schedules soon. W8BBR also turns in a nice one. W8BKM got 109 lined up. W8DDF put a few through. W8CWC is a golf nut. W8DJV is on with an 852. W8CXW likes 3500.

W8ADS has school QRM. W8CIY reports QRL YL's and business. W8BAU has been active in A–A work. W8DDK turns in a nice total. We lose W8RN again for the summer. W8CSS is on 3500. W8DDQ still wants high school schedules. Get together, W8ARM and W8DDQ. Imagine three brothers fighting for one key — that's W8CFT. W8ARP reports. W8ARP and W8DVL handled some. W8OQ, W8CNU, W8ALW, W8BAH, W8AYO and W8ARW handled a few each. W8QU, W9DIH, W8JA and W8DAE knocked a couple down. W8CCS, W8APB and W8EJ caught one or two. W8DHS, W8DSY, W8CXD, W8CFL, W8BBH, W8RN, W8BKQ, W8ALC, W8LI and W8PL said hello.

Traffic: W8CMB 220, W8CNO 212, W8GZ 206, W8BYN 198, W8CRI 157, W8BBR 147, W8BKM 109, W8DDF 80, W8CWC 69, W8DJV 47, W8CXW 47, W8ADS 36, W8CIY 34, W8BAU 34, W8DDK 33, W8RN 26, W8CSS 24, W8DDQ 19, W8CFT 18, W8ARP 17, W8DVL 14, W8OQ 9, W8CNU 8, W8BAH 8, W8AYO 8, W8ARW 7, W8QU 7, W8DIH 6, W8JA 6, W8DAE 5, W8CCS 3, W8APB 3, W8EJ 2.

KENTUCKY — SCM, J. B. Wathen, III, W9BAZ — W9FS is our star traffic handler this time. He is now tied with W9OX in the "Fight for the Pint." One month each. Who will make it the "Eternal Triangle"? W9BXK says he is climbing the ladder to the BPL. W9JL has the usual fine total. W9EKM promises a 250 with xtal. W9BWJ let his license expire. W9FBV is working hard to get on the air again. W9GGB and W9GJG have applied for ORS tags. W9GGB wants to QSY Ky. stations on 28 mc. W9ARU is painting. W9FZV says everyone is QSA–5 on his new receiver. FB, OM. W9MN now has a "pink ticket." W9AZY gives promise of big doings. W9OX has had considerable trouble with his new antenna. W9CEE is QRW with work and school. W9EYW has had troubles galore. W9ENR is looking for DX on 14 mc. W9BAZ is the proud owner of a niece of Henry Ford. Will use her to visit the gang week-ends. W9GAL copyrights — "Traffic not as good on 40 as on 80." W9BAN was QSO Oslo, Norway. W9FQN has been appointed ORS. Reports showed a decided change for the better. Keep up the fine work and we will soon lead the Division. When we do, it's a dinner for all at my expense. That's a promise Sic 'em, gang.

Traffic: W9FS 226, W9BXK 114, W9JL 85, W9GGB 45, W9BAN 26, W9ARU 22, W9FZV 19, W9BAZ 17, W9GAL 17, W9MN 13, W9AZY 11, W9OX 11, W9CEE 5, W9EYW 5, W9GJG 5, W9ENR 3.

MICHIGAN — SCM, Dallas Wise, W8CEP — W9BTQ now has the 852 perking. W8LJ is a newcomer. W8DED has dropped most of his schedules and will rest up some this summer in order to be ready for the fall rush. W8BV has sold his 210 outfit. W8ZF has a new receiver. W8JD handled a nice bunch of traffic and did some very fine DX with a 210. W8KD is the only ham in town and suppose he gets blamed for all the QRN, etc. W8AAH is having trouble getting his station license renewed. W8BGY is doing a little DX now and then. W8ACB has a new transmitter and receiver now. W9CE manages to radio a little now and then. W8AUT has been going pretty well. W8AUB says they missed out on doing some emergency work during the recent storm due to no station in Ludington. W8AJL now has his commercial license. W8DFS blew his transmitter tube but came back with a couple of 201A's. W8CAT is still trying to get a fone working on 3500 kc. band. W8DSF will be on 14,000 kc. for the summer. W9AXE says the DX is FB. W8DYH lost his antenna in the recent breeze. W8CKZ has been silent due to business. W8CU is rewiring the house. Walt Colpus of Pontiac, reports the sector quiet around there. W8CWK is in the BCL business.

Traffic: W9BTQ 16, W8DED 187, W8BV 3, W8ZF 1, W8JD 52, W8KD 30, W8AAH 7, W8BGY 38, W9CE 27, W8AUT 16, W8AUB 14, W8AJL 15, W8DFS 36, W8CAT 23, W8DSF 31, W9AXE 9, W8DYH 183, W8ASO 5, W8CKZ 9, W8BRS 19, W8CEP 15.

ILLINOIS — SCM, F. J. Hinds, W9APY — W9AFB has a good DX on 14 mc. W9DGK has a new 1929 TPTG. Look out for someone illegally using W9IZ's call with AC on 14 mc. in the morning. W9AVL is busy getting W9AKL on the air at Millikin University. W9BPX works good fone with a YL in Missouri. W9AP is down on off-wave stations. W9BVP and W9FCP are moving. W9CIA works Australia and Asia on 14 mc. W9NV lost a mast and a 75 watter. W9CUH is going to 14 mc. for the summer. W9BNI says he will never move again. Hi. W9CKZ is one of our new ORS. W9KA is now USNR. W9KB has a new Hi C TPTG. W9CZL has a brand new 250 watter. The new Chicago Radiophone Club is coming along nicely. W9DOX is busy with W9CNH. W9FDJ worked Egypt, Chile, and England. W9CRR is one of our new traffic men. W9CRR is installing a 14 mc. outfit. W9EYA has rebuilt. W9FMR has a new Zepp. W9CNH is doing fine traffic work in the 20th Century Route. W9GJ recommends DC for plate supply. The Austin Radio Club has an Aero TPTG going with call of W9BZD. W9DLI and W9BOL sport new apparatus. W9ERU has been busy chasing Broadcast harmonics. W9BXB and W9FFQ are trying out 14 mc. W9CNY likes his new voltage fed Hertz.

Traffic: W9ERU 243, W9DXZ 226, W9EJO 122, W9BZO 85, W9FI 82, W9APY 54, W9CNH 43, W9GJ 42, W9DFY 38, W9CIA 37, W9FDJ 34, W9AP 20, W9CZL 20, W9AFB 18, W9FO 14, W9CUH 13, W9FCW 12, W9CKX 11, W9CRR 10, W9IZ 10, W9BPX 9, W9AVL 8, W9KA 8, W9KB 7, W9FZE 6, W9CNY 5, W9DGK 5, W9ECR 5, W9BEF 4, W9BSH 3, W9ACU 2.

WISCONSIN — SCM, C. N. Crapo, W9VD — W9DLD is cancelling all schedules until fall but will still be on the air at irregular periods and glad to QSP always. W9BPW is using push-pull Hartley and will be rebuilding during the summer period. W9BWZ is anxious for schedules in Madison and also one in Iowa. W9DTK reports that the V3 men are now handling all Fleet Reserve Despatches and communications from week end cruises. W9DLQ will be off the air for a time rebuilding. W9BGT (ex 9CWZ) is on the air again and wants to hear from the gang. W9FBJ (ex 9BSO of Hudson) now operates from Madison using a DeForrest H tube in Hartley circuit. W9CVI is doing a lot of experimental work. W9EUH sent in four reports from other stations. W9DCE will have crystal going soon again. W9EMD is all set for traffic. W9DJK says the LaCrosse Club has 25 members and going strong. W9LV still strong on deliveries. W9FHU has spring fever. W9FAW is on daily from 6 to 7 a.m. W9SO is building a 4 tube screen grid receiver and experimenting with television. W9EHD sent totals via amateur radio. W9BQQ handicapped by heavy QRN and night work. W9AZN still reports regularly. W9BIB has moved to the basement and now gets on the air a little more regularly. W9DEK, poor cus, has spring fever — new Chevy coupe and a new girl — and the transmitter lays idle. W9VD is going strong again.

Traffic: W9DLD 338, W9BPW 92, W9BWZ 75, W9DTK 49, W9DLQ 33, W9BGT 33, W9FBJ 31, W9CVI 29, W9EYH 26, W9DCE 26, W9EMD 16, W9DJK 12, W9LV 14, W9FHU 14, W9FAW 11, W9SO 7, W9EHD 7, W9BQQ 7, W9AZN 5, W9BIB 4, W9DEK 1, W9VD 9.

INDIANA — SCM, D. J. Angus, W9CYQ — W9EF was heard on schedule on 28 mc. in Australia, Brazil, England and France. FB. W9EXW wants schedules. W9DBJ has his xtal perking on 7000. 4 kc. W9AHB is putting in 2 852's. W9BKJ is back to 3500 as he couldn't stand the racket on 7000. Hi. W9BZZ is back on the air after breaking his 852. W9AJA, Neil Werner, is back in the ham game after 8 yrs. commercial oping. Location now Hammond, Ind. Welcome. W9ASX is going to radio school at Valparaiso. W9EKW is busy with Army-Amateur work and requests any stations interested in that locality (Richmond) to see him. W9FQ is the new RM for the NW corner of the state. All stations in that vicinity who are not ORS, please get in touch with W9FQ with your reports and requests for information. The license of the telegraph school at Valparaiso, W9RW, has been temporarily suspended. W9EPB is still the only one reporting from Elkhart. W9AFA is going to take a trip with MacMillan in June to Labrador and Baffin Land. W9EVA is going to op on the Lakes this summer. W9FZQ finally connected with his first six.

The Indianapolis Radio Club are going to have a hamfest May 18th and 19th to which all hams are invited. Place, clubrooms at 460 Century Bldg., Indianapolis. Bring your lunch, as there will be fees to cover banquet or anything else. R. B. Annis, Pres.

Traffic: W9EKW 113, W9ASX 59, W9CMQ 60, W9EF 47, W9AJA 33, W9BZZ 1, W9GCO 5, W9PF 3, W9BKJ 8, W9FCG 10, W9AHB 3, W9DSC 43, W9GBF 21, W9EMR 33, W9DHJ 16, W9CNC 14, W9DBJ 17, W9EXW 20, W9CYQ 17.

WEST GULF DIVISION

SOUTHERN TEXAS — SCM, Robert E. Franklin, W5OX — Two stations make the BPL this month — W5AQY and W5ASM. W5ABQ was fortunate in being able to get first hand information from VK2RB concerning the finding of the Southern Cross. W5AQY complains of bad QRN but from the looks of his message total, it hasn't got the better of him. W5ASM sends in his usual nice message total and is keeping several good skeds. W5AHB promises to be one of our leaders in traffic. W5MS reports that Corpus Christi is blessed with two new stations, W5TO, formerly of Aransas Pass, and W5BBY, a new ham. W5LP sends in a good report. W5AHP is punching a mighty hole in the ether. W5JR is on the air again with low power. W5OX has been rebuilding.

Traffic: W5AQY 290, W5ASM 127, W5AHB 112, W5ABQ 38, W5MS 38, W5LP 36, W5OX 19, W5AHP 6.

NORTHERN TEXAS — SCM, J. H. Robinson, W5AKN — W5HY's YL must have quit him, from the looks of his message report. He accuses the SCM of being a BCL ham. A dirty dig, for sure. W5BBF says he has been experimenting with anti-key thump filters. W5ATZ has a funny happening to report: He mailed a message to a girl in Ft. Worth, Texas, from China, relayed through W6CZM. The girl wrote back and said, "Instead of sending fake radiograms, tell 'Bill,' the signer of the message, to get himself to Ft. Worth and QRT the comedy." (We wonder if "Bill" is in China or Denton, Texas.) W5AAE is still getting out wonderfully with his CX210 and the Ford Coil transformer. W5JD is working on a static eliminator. W5BAD has QRM from school activities. W5BAM is on 14 mc. and 7 mc. W5AKN is now W5BG. W5AVD is in the 1780 kc. band. W5DF is busy. W5WW got his report in just in time for the boat.

Traffic: W5HY 45, W5BBF 18, W5ATZ 16, W5AAE 14, W5JD 8, W5BAD 7, W5BAM 7, W5AKN 2, W5WW 34.

OKLAHOMA — SCM, Wm. J. Gentry, W5GF — I wish to thank all of you for the support you gave me. Gang, the reports sure were poor this time. Let's have more pep now, OMs, and get them in on time. W5BEE is the high man for this month. He and W5ASQ and the rest of the Tulsa gang are getting high power fever. The Alpha Sigma Delta at O. U. are experimenting on xtals. W5AOX and W5KX have stal fone sets now. W5AYF is a new ORS. W5FJ is active. W5GF is building a new outfit. The Army Net is getting started now. Let's report 100% from now on, fellows — will you do it?

Traffic: W5BEE 17, W5ASQ 13, W5GF 6, W5AYF 5.

CANADA

MARITIME DIVISION

NOVA SCOTIA — SCM, A. M. Crowell, VE1DQ — VE1CC and VE1AS are pounding away on 14,000 kc. VE1BV finished his new monitor and says it's FB on the new transmitter. VE1BW is a new ham in Halifax. We regret to report change of QRA for VE1BN and hope to hear him on soon with a "2" call. VE1BR was heard getting a QSA5 from PB7A. VE1DA is on 7500 kc. VE1DM only has Sunday afternoons at the set. DX signals have been remarkably good during the past month, especially the British and African stations. VE1DQ expects to be on the air soon.

ONTARIO DIVISION

ONTARIO — SCM, E. C. Thompson, VE3FC — Southern District: F. W. George, VE3CS, Asst. SCM — VE3AQ tried MOPA, but came back to the old Hartley again. He is handling some traffic which is of importance. VE3DG and VE3BV paid a flying visit to London for the WOARA meeting, and went through fog, storms and floods getting back, but it was sure FB to see them again. VE3CB breaks out by clicking with NJ2PA. VE3HB is loaded up with zepp antenna dope. VE3CS bangs a signal to SU8RS, Cairo, Egypt. That makes a total of 43 countries now. Central District: VE3BC leads as usual with a fine traffic total. VE3CL works the ninth district. VE3BT is worrying about crystal control. VE9AL keeps two or three schedules on 4000 kc. VE3FC keeps a schedule with W2MY on 3900 kc. VE9BJ uses 4000 kc. VE3HP is on the air again. VE3AL has a portable station at the Home and Garden Exhibition at the Coliseum, Toronto, and has the booth of the Wireless Association of Ontario and the American Radio Relay League. Northern District: VE3AR now boasts a new station under the call of VE3BH. VE3HU gets out very FB with fone on the 1750-kc. band. VE3ET is away on a survey party up north. VE3AR is returning to 4000 kc.

Traffic: VE3BC 38, VE9AL 21, VE3FC 11, VE3AQ 6, VE3HB 6, VE3BO 9, VE3EG 6, VE3CS 4, VE3CB 3, VE3BV 3, VE3CL 3.

VANALTA DIVISION

ALBERTA — SCM, E. J. Taylor, VE4HA — VE4AF is traffic leader this month. VE4GD worked CE3BF on 14,000 kc. The family at VE4EI is getting out FB. Sorry to hear VE4CC indisposed at this time. VE4EG will be on soon. VE4RA is coming out with a fifty. VE4IT is on with various notes. The area at Calgary held nice banquet and meeting, plenty of pep apparent. Glad to see you fellows in the south intend making it a monthly affair. VE4QO is on consistently. VE4EY and VE4EP pretty busy completing portable phone set for Ted at VE4EP. VE4HM is on right along. VE4CU is on every Sunday with official broadcasts. VE4FT has a real DC note. VE4FF comes in right along. VE4JF is doing FB. VE4HA is on 14,000 kc.

Traffic: VE4AF 30, VE4EI 22, VE4GD 8, VE4CC 6, VE4IO 1, VE4EY 10, VE4HM 6, VE4CU 15.

BRITISH COLUMBIA — SCM, E. S. Brooks, VE5BJ — VE5AL has moved to 4868 Blenheim St., Vancouver, and reports having plenty of work to do before fitting up the old heap again. VE5BR put in a small dynamotor and keeps daily skeds on 3500. VE5CO receives lots of crystal reports on his CRAC input. VE9AJ was visited by Ross Hull from Headquarters on his return to Australia via Vancouver and gave the gang some good pointers. Your SCM would sure appreciate some reports. How about it, fellows?

Traffic: VE5BR 33, VE5AL 15.

PRAIRIE DIVISION

MANITOBA — SCM, D. B. Sinclair, VE4FV — VE4IC is still going strong. VE4GQ has a real set on the way. VE4DJ hooked K6ALM on the 14-mc. band. VE4DU heard Japan on 7 mc. VE4DB worked Hawaii. VE4FV thinks he worked Hawaii. VE4DK and VE4FN have steady sharp signals that push out fine. VE4HR is very consistent around the continent. VE4JB gets out very well with his 210. VE4DP took back the 210 at VE4HX, which is now reduced to a 201A. VE4IM will use a low-power set. VE4BD is using a 50 and getting out FB. VE4DI is taking VE4DW's place. VE4DW is visiting in Winnipeg.

Traffic: VE4DK 11, VE4DJ 8, VE4FV 6, VE4FN 5, VE4JB 5, VE4HR 4, VE4GQ 1, VE4DB 2.

SASKATCHEWAN — SCM, W. J. Pickering, VE4FC — Where, oh where, is the Regina gang which is supposed to be so active but never tells anyone about it? How about a little news from you fellows? VE4CM tops the list this month. VE4GO has broken into the message handling game. VE4IH will be on the air Sundays and rainy days this summer. VE4JG spent Easter with him. VE4GR is trying to find a new location free of bathhouse QRM.

Traffic: VE4CM 23, VE4GO 19, VE4IH 12, VE4GR 8.

Late and additional reports:

W4AIQ would like to test with any station including foreigners of any country between the hours of 2 and 4 a.m., CST on Wednesday and Saturday of each week. W9DOE has kept the father of W6EH (Mr. Messman) in contact with his son, W6EH constantly for the past five months. W1YB has schedules with W8CMG and W9FBX. W4CT handled quite a few.

Traffic: W9DOE 51, W1YB 69, W4CT 49.

I.A.R.U. NEWS

WE had hoped to have the results of the Prague conference to report in this column this month; unfortunately, however, no word has been received of the outcome at the time this department is being written up, and so we must postpone announcements until next month.

As mentioned last month, I.A.R.U. Headquarters was particularly interested in the amateur proposals submitted by the Dutch Government. On the whole, these proposals seemed very satisfactory. Our own State Department asked us to comment on them, for the information of the United States delegation to the conference. In reply to this request, Headquarters submitted detailed comment on every feature of the Dutch proposals.

To supplement this, Secretary Warner had a special conference with Mr. W. D. Terrell, chairman of the United States delegation, just prior to Mr. Terrell's departure for Prague, and further discussed features of the amateur situation. Mr. Terrell was also furnished with the names of various European amateurs and societies. Since he has long been a friend of the amateur in this country in his capacity of Chief of the Radio Division of the Department of Commerce, we know that the European amateur representatives at the Prague gathering found him a sympathetic ally.

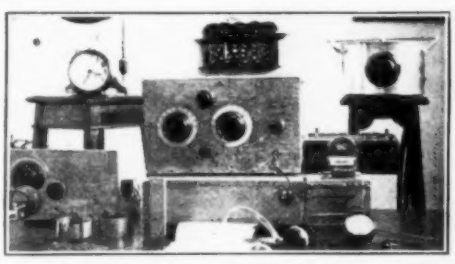
In addition to the above steps, Union Headquarters also sent summaries of the comments on the Holland proposals to various officials of certain sections of the Union in Europe whom it was thought would be present at Prague. A copy of the summary was also sent to the officials of the S.K.E.C., the Czechoslovakian amateur society, and one of the proposed new members of the Union.

As this report is being written, the June Calendar of the Union is about to be sent out, this being the first under the new Constitution. Officials of the various member societies will probably have received their copies of this document by the time this issue of *QST* is issued.

In addition to several proposals of new members of the Union, certain other matters of importance are presented for action. We want to again emphasize the necessity for prompt action on the part of all member societies, and request that the votes solicited on certain questions be acted upon and sent back to Union headquarters as rapidly as possible.

As mentioned in the paragraph above, several new societies were proposed for membership in the June calendar. While the next calendar will not be sent out until December of this year, we want to urge that any society wishing to apply for membership in the Union take steps promptly. It frequently takes a large amount of correspondence extending over several months to get all the information which Headquarters must have before it can present any society for membership. With this in mind, we urge that societies wishing to be proposed in the December calendar write us promptly.

Membership in the Union is open to any national amateur radio organization.



THE STATION SHOWN HERE, AC1TB, IS OWNED AND OPERATED BY MR. F. S. PARSONS, AT HARBIN, NORTH CHINA

Due to import restrictions, much of the station is home-made, Mr. Parsons possessing a lathe and being handy with tools. The station is thoroughly up to date. Note the monitor at the right.

The transmitter (not shown in the picture) is a loose-coupled Hartley using a single UX210. 500 volts d.c. is obtained by combining 220 volts from the mains and 280 volts from batteries. It is expected that a dynamotor will soon replace this arrangement. The receiver is a tube-base set built from a QST article. In spite of extremely heavy local QRM this station has worked all over China and Occania, and hopes soon to QSO the United States.

AUSTRALIA

By W. G. Sonn, Publicity Officer, W.I.A.

The allotment of wavelengths under the terms of the Washington Conference is as follows: 60 to 56 megacycles; 30 to 28 megacycles; 14,400 to 14,000 kc.; 7300 to 7000 kc. and 1990 to 1200 kc. (150 to 250 meters). The last-named was granted for the benefit of the phone workers, of whom there are a considerable number, who carry out work after the usual broadcasting hours, mostly on Sundays. This band is only temporarily granted, however, and will be reconsidered at the end of twelve months.

Consternation was very great when it was seen that no provision had been made for us in the 4000- to 3500-kc. band, but after several consultations with the P.M.G.'s Department the whole band was temporarily opened to us until the 1st of July, 1929. It is proposed by the Department to utilize this band for a point-to-point public telephone service between Tasmania and the mainland, and for defence stations, but they are not yet ready to be placed in operation. We are hopeful that with this slight respite we will be able to press our claims so that even a portion of the band may be retained after July, in which all local work can be conducted and thus leave the higher frequencies for international contacts in accordance with the recommendation of the I.A.R.U.

On the higher frequencies, the 7000-kc. band is being utilized more than the 14,000, though a number of stations are gradually finding their way down there and discovering the DX conditions are better (for the present, at any rate), more especially with the G's, who are coming through fairly strongly in the late afternoon, Melbourne time.

Thirty megacycles is very quiet, although most of the gang is plugging away. Contacts, aside from locals, are very far apart. Several experiments are planned, mostly in connection with radiating systems and better results are anticipated with the approach of our Winter season.

In connection with the other alterations to existing regulations to bring them into line with 1929 requirements, the Department has stipulated that all stations must be in possession of a reliable frequency meter, but we are glad that they did not follow the example of the G's in insisting that it should be based on crystal standards! For Aussie requirements, Hull's frequency meter and monitor set should fill the bill nicely.

Sub-standards are to be supplied by the Department to each Division of the Institute, and from these standard frequency transmissions will be undertaken.

Regarding message traffic, we are permitted to exchange personal messages relating to tests, but originating or relaying messages for a third party is still strictly "taboo."

The Defense affiliation which the Wireless Institute of Australia has long been trying to effect is now taking definite shape. The whole scheme has not been adopted, as the Army and Navy have not yet found a means of employing a reserve of amateurs, but the Air Force, visualizing the potential value of an Air Force Communications Reserve, is enthusiastic about it.

The enrollment and organization is now being made and will be very similar to that of A.R.R.L., modified to suit our local conditions. The work of the Reserve will consist of tactical "drills" and exercises, by radio, to train the personnel in Air Force procedure. Weather observations from country districts will also be supplied, a scheme which will be of considerable value in compiling charts on weather conditions over all parts of the Commonwealth, particularly in country districts.

A systematic survey of transmitting and receiving conditions over a great part of the continent in conjunction with Air Force stations is also planned. When the organization is complete, pilots will be supplied with charts on which the location of reserve stations is plotted so that in the event of being forced to land, a station capable of communicating with the aerodrome direct can soon be found, instead of having to endure the delay which ordinary telegraph communication would entail.

BELGIUM

By Paul de Neck, President, Reseau Belge.

On the 7000-kc. band, work has been hampered by heavy QRM, and DX contact is a difficult task. To a certain extent, of course, this is to be expected. ON4EA on this band made the first contact between Belgium and the Isle of Reunion, east of Madagascar.

The 14,000-kc. band is the real long-distance wave, and gives fine results. ON4AR-4RO on low power, ON4EW, ON4DI and others have worked W hams, and in addition, Java, China and South America. ON4EW made the first contact to Ascension Island.

The contact with the training sailing ship, *L'Avenir* (XEB4WK) has been extremely successful. QSO's are obtained daily, with the exception of four days when the ship was in the Antillian seas, just before arriving at Tampa, Florida. We had the pleasure of learning that W hams from the fourth district were visiting the ship in Tampa harbor. It was a great satisfaction to learn that W4TZ, an engineer at WMBL, said the XEB4WK layout was "the prettiest transmitter and receiver he had ever seen!"

We were pleasantly surprised to have a visit here from W2DR, who from the station of our Secretary, ON4OU, had a good fone conversation with the well-known French actor, EF8IL, and had a nice chat with XEB4WK from the station of our Traffic Manager, ON4FT.

In our next report we hope to be able to give some results of the work accomplished by our hams on the 28,000-kc. band.

CZECHOSLOVAKIA

By Jan Bisek, President, S.K.E.C.

In this country, the short-wave transmitting amateurs have formed themselves into a society called the Association of Short-Wave Experimenters of Czechoslovakia — the S.K.E.C. This organization has as its aims the bonding together of amateurs for mutual benefit, the obtaining of license privileges for amateurs, and the maintenance of friendly relations with governmental agencies. Amateur transmitting here is not generally allowed, as yet, but licenses have been granted to some schools and laboratories. The Department of Telegraphs is not actually against amateur work, as evinced by the fact that it has supported the Washington Treaty of 1927. Our only real trouble, in fact, came from the Department of the Interior, which was afraid that amateur stations might be used for propaganda and other undesirable purposes. To over-ride these objections was one of the tasks of the S.K.E.C.

We are glad to state that recent affairs have taken a more favorable turn, with respect to transmitting. The Department of the Interior is gradually coming to the viewpoint that amateurs, in their own interest, would not allow any of their members to misuse amateur privileges. However, for the present, amateur operation here continues to be "under cover" and all QSL cards should be addressed with this in mind.

Negotiations have been carried on over a period of some months with a view to having the S.K.E.C. recognized as the National Section for Czechoslovakia, and it is hoped that we will soon be a member of that great international body.

For the most part, the transmitters here are of low power, although some of them use as much as 200 watts.

In the 14,000-kc. band much more work is being done than a year previously. On 28,000 kc. there is not much activity as yet, although OK-AA2 has heard W2JN with fair signal strength.

FRANCE

By R. Larcher, Treasurer, R.E.F.

Whether due to cold weather during the early part of this year, or to the QRM, we do not know, but at any rate, DX activity was not so great among French hams.

QRM on 7000 kc. has been pretty bad; occasional American signals come through, but trying to work them is extremely difficult, and at times, impossible. During the morning, signals from Australia and New Zealand have been heard with good strength.

Conditions are better on the 14,000-kc. band, due to a great extent to the lesser amount of QRM. F8BTR, F8EO, F8GDB and F8JF were active here. Activity in the R.E.F. has been toward 28,000 kc., however, and in this band regular transmissions are carried on by F8AAP, F8CT and F8JT. F8BU (ex RO1O), F8JN, F8KV and F8WC are on occasionally. The head of the R.E.F.'s Oceanic Section (00BAM at Tahiti) is getting ready to operate on this frequency too. F8JN reports hearing W2JN, W1CPB, W2ALW and W8GG on "ten."

Good weather will soon arrive, and with it we hope that the activity of French stations will revive on all wavebands. It is believed that many of them have thoroughly modernized their stations, and that they are now fully equipped to operate in "1929 fashion."

Much interest in the R.E.F. is being aroused over the *first* French amateur convention, which is to be held June 1 and 2, at Paris. (FB OMs!! A.L.B.) A splendid program has been arranged, with lectures, discussions, visits to nearby commercial stations, and a banquet.

GERMANY

By E. Reiffen, Secretary D.A.S.D.

On the 7000-kc. band, DX conditions became poorer. Good communication with United States stations is now best in the early morning. There is little to be heard on 14,000 kc., although ZS stations came through well around 1700 G.M.T. in the afternoon. We have nothing at all to report on 28,000 kc.

On the 7000-kc. band, a number of low-power transmitters were active, and established many excellent DX contacts. On the 14,000-kc. band, most of the activity occurred on Sunday.

ZL stations are unfortunately heard very seldom since the abandonment of the 10,000-kc. band. A few ZL's have gone over to the 7000-kc. band, so that D4DKF was able, recently, to work ZL1FW, at 1830 G.M.T.

Lately a few D stations have gone to crystal control; D4BY, D4AU, D4ABR and D4CS. The tendency amongst D stations is toward higher powers, and in consequence a few new DX hounds will be heard on the 14,000-kc. band.

GREAT BRITAIN

By J. Clarricoats, G6CL, R.S.G.B.

Conditions on both 7000 and 14,000 kc. were very good during March. This seems to be one of the best months of the year for DX working, and many of our stations have recently claimed to have worked all continents. (We still issue W.A.C. certificates. — A.L.B.) The 14,000-kc. band has been particularly active, for besides the many Europeans who have come up from

(*Continued on Page 78*)

Calls Heard

VK3CX, Alan G. Brown, 8 Mangarra Rd., Canterbury E7, Victoria, Australia

14,000-kc. band

w1anz w1awe w1bjd w1bux w1cek w1cmx w1cok w1mr w1pd w1ry w1sf w1xv w2abu w2afj w2afo w2api w2aql w2afb w2bcp w2bvg w2eh w2ejx w2eue w2eus w2euz w2ef w2gt w2kx w2mk w2ne w2qu w2up w3cee w4aef w5arz w5kl w6chy w8ahc w8amh w8arx w8azg w8ccw w8cvq w9aas w9che w9cxx w9doq w9ef w9fa w9fhy ve2ca ve2bg k49 k1af k1em k6av1 k6c1j k6db1 k6dpg k6dtg k6eha au4db d4dba d4yp f8cp f8ct f8btr f8eo f8fd f8sm f8wb f8xz g5by g5bz g5ma g5m1 g5wk g6hp g6qb oh2nm sm4zf la1g eu2ai pk1jr pk4az vu2kw vu2kt vu5vx vu2yx vs3ab file su8an oa4h oa41 oa4s lu4dq lu3dh sc1ah sc1ai rwx yi1lm yi1ac yi1mdz on4fp

7000-kc. band

w1pe w2cvj w3rd w4tk w5asb w6avj w6ec w7iq w8bau w8dxe w8gz w9bqe w9cyx w9gv w91n wsbs wsq ve2be k1af k1hr k1pw yi1lm yi1mbz on4fp f8axq f8kp ae8rv ae9aa xeb-4wx

BRS188, Basil Hall, 25 Coombe Gardens, New Malden, Surrey, England

7000-kc. band

w1abz w1acd w1af w1agi w1ajx w1aoo w1aqo w1aqs w1avl w1axx w1bbz w1bgo w1cnp w1cqs w1gw w1lg w1si w1sz w2agp w2ajt w2anm w2aqi w2aub w2aya w2azk w2bac w2bfy w2blx w2boz w2cuf w2evu w2dk w2kj w2nt w2rk w2vc w3anh w3aws w3jw w3ld w3mv w3nr w3sf w3ut w3zzc w4aba w4abw w4aef w4agg w4ahl w4aq w4sd w4we w7mo w8awp w8ayw w8beu w8bti w8byn w8chd w8rl w9aoy w9azy w9dbj w9dck w9dgz w9efk w9elb w9exw w9ezw w9gau cm3af ct2aa fmear58 fm8ev fm8rit hc1fg kdv5 kfr5 zl4ae os1dsa rwx

14,000- and 28,000-kc. bands

w1aao w1abg w1aci w1adp w1adw w1aed w1aep w1af w1ahx w1akd w1alb w1alz w1apq w1aqd w1aqt w1arc w1asj w1asu w1avx w1awe w1awm w1aze w1beu w1bkf w1bsm w1bux w1cek w1cel w1cfi w1cje w1cmx w1cmy w1cpt w1da w1dp w1fk w1fs w1ia w1kh w1mr w1od w1py w1sf w1we w1wv w1zd w1zz w2abu w2acn w2adb w2adh w2adj w2adp w2aef w2afj w2ahi w2ail w2aof w2aog w2aou w2api w2aql w2arb w2ary w2ate w2avb w2avz w2ays w2bdc w2be w2bhq w2bjr w2bou w2bvq w2eh w2ejx w2es w2evf w2eyq w2fl w2fy w2hq w2hr w2jn w2jz w2mb w2md w2rs w2ws w3adp w3aqj w3ath w3bd w3bhm w3bpr w3btq w3jn w3cee w3eq w3jm w3oh w3ow w3ux w3vg w3vx w4ab w4act w4adb w4aef w4ahl w4aii w4ajk w5ux w8adm w8afg w8ahe w8ann w8aur w8axa w8ayo w8azo w8bwu w8chf w8chi w8epe w8era w8ddf w8djv w8doa w8duw w8hx w8ja w8kr w81v w9aok w9bfw w9bqy w9ekj w9crr w9eae w9fxj w9ka ai5vx ap1ap ar8ufm au7ab au7ap au7au ce2ab ce3ac ce7aa cm2jt cx1ev cx1na ff1m file fk5er fm8ev fm8kik fm8rit fmtun2 folsr fvm2 k1em k4akv k4ni lu3dh lu4dq lu9dt ne8ae nj2pa pk1jr pk4az py1aa py1bl py1ca py1em py1eu py1er py1et py1ib py1id py1tr py2aj py2ak py2bc py2ih py2qa py3ah sb2sb sc1ah su8an su8ar su8rs v1ap v1ar v1ay v1bd v1br v1co ve2ac ve2al ve2ap ve2bg ve2bh ve2ca ve3bm ve3qs vk2aw vk2ek vk2kl vk2lj vk2no vk2rx vk2xr vk3bd vk3bq vk3cp vk3cx vk3lp vk3my vk3ot vk3pm vk4bb vk5bj vk5bw ve5hg vk5jh vk5wr vk5xg vk6he vq2bh vs1ab vs1wb vs3ab vs3gg vt2kt vu2kw yi1lm yi2gg zl4ab zl4ac zl4ba zs1a zs2n zs4a zs4m zs5c zs5d zs5u zs6p zt1j zt2c zu6e xpaocp xtaoja xw7eff nkf ozmc rwx

OK-RP18, Henry Rakosnik, Sedlec pod Kaukem, Czechoslovakia

w1ac w1axx w1bux w1caw w1mr w1sz w2afo w2ap w2api w2cuf w2exl w2dk w3mv w4aba w4aef w4aqi w4cy w8ahc w8bk w8cdb w8dkx w8gz w9asq w9avl w9bdp w9dgz w9el w9etq w9kdy w9xi au7aa au7ab au7ao au7as k1em ok1az ok1kx ok1na ok1ok ok1rf ok1rf ok21o ok2pa ok3na ok4qo ve2ac vk3bd vk5vx vo8ae vq2bh vu2kw yi1ac yi1lm yi1mdz zl2mo zs4m

K4ACF, Aubrey C. Levi, 7 Snegle Gade St., St. Thomas, Virgin Islands of the U. S. A.

7000-kc. band

w1aak w1acd w1ang w1bif w1bz w1cmf w1cmp w1epo w1cq w1erw w1efa w1gh w1im w1mk w1rp w1se w1ss w1uz w1wu w2agc w2akt w2anh w2apk w2apv w2apx w2bfi w2bhu w2bhv w2bif w2bo w2boj w2exl w2ep w2uk w2xg w3add w3aer w3ahg w3aim w3ain w3aks w3alu w3amb w3anh w3arb w3ard w3arp w3awq w3bhx w3bwl w3hl w3mv w3nt w3ut w4ac w4acc w4aeb w4aef w4aen w4agz w4ahl w4aiq w4anf w4aq w4bz w4cf w4dv w4ei w4ft w4jr w4ky w4lx w4oz w4rr w4qu w4to w4ut w4uy w4vaw w4we w4zo w4zp w4zy w4zzc w5af w5ahb w8ain w5akp w5aml w5apo w5awd w5ayb w5bcz w5bdg w5hy w5jd w5mx w5nd w5qq w5sr w5ux w5zav w6afp w6awp w6bhi w6cui w6eaa w6efc w8afm w8ajt w8amp w8an w8apq w8ayh w8aym w8awp w8bek w8bg w8bk w8bts w8cgo w8cib w8cnx w8ddk w8ddq w8dph w8drj w8dyz w8gv w8it w8lc w8lf w8lq w8lv w8uk w9abu w9afb w9ban w9bcs w9beu w9bly w9bnd w9bol w9bpd w9bqe w9bx w9bxk w9evn w9eye w9flb w9dpv w9dzx w9ek w9etq w9ewh w9fs w9fyp w9gal w9hw w9jl w9lk w9qc w9um w9xi kdv5 eb4eu ve2bb kfr5 x29a nr2hc kfzu

14,000-kc. band

w1alb w1bk w1bux w1cek w1dp w1dq w1mr w1om w1pm w2adl w2adp w2ahi w2akg w2alg w2anj w2ayb w2bao w2be w2chw w2fp w2gp w2ig w2jn w2up w3atw w3cee w3jm w3ky w3oh w3oq w3rr w3vg w4act w4acy w4aef w4afe w4ahb w4aiq w4cl w4ec w4gv w4my w4nl w4oa w4uv w8ako w8aop w8arx w8av w8brh w8bwu w8ccs w8ccw w8ced w8dae w8hh w8qu w8re w9ax w9def w9duz w9ef w9fhy w9gfz w9ka ve2ca ef8ct nj2pa ef8sm ear96 oa4ai

KFR5, Walter Berg, France Field, Canal Zone

9000 to 7000 kc.

w1aak w1adg w1asx w1bat w1bea w1bgq w1bil w1bxg w1edg w1emf w1eng w1ln w1mk w1erd w1rp w1sf w1sp w2aja w2alu w2ase w2ate w2baq w2ais w2bda w2bdz w2beh w2bek w2bhn w2blx w2bne w2bmx w2cnm w2cty w2cuf w2euz w2euq w2exl w2cyx w2dg w2gt w2fn w2il w2mb w2ov w2qu w2xad w2xaf w2xas w2xi w2xs w3aaj w3aee w3aim w3ais w3ajt w3alp w3anh w3ib w3aws w3ard w3asa w3auw w3ax w3bel w3bhx w3bn w3bnf w3bnu w3ez w3lz w3tc w4aah w4aas w4acc w4aeq w4ahl w4ahy w4aib w4ajy w4alb w4aq w4ck w4cs w4dt w4ea w4fe w4fn w4ft w4ib w4ky w4mi w4ni w4nl w4px w4qb

w4si w4th w4to w5aak w5aar w5acl w5acx w5ae w5aek w5afe w5afj w5afx w5agp w5ain w5akz w5aoz w5apg w5apq w5aqe w5aqy w5atz w5awq w5ayl w5ayo w5asl w5azd w5azr w5bad w5bat w5bbe w5bbo w5bem w5bex w5bdx w5bdy w5bfe w5ea w5gl w5gr w5hy w5hz w5je w5kh w5ky w5mx w5ox w5ql w5qo w5qx w5rg w5sp w5tg w5uk w5ux w5vv w5wa w5wf w5wo w6aak w6ab w6abg w6ah w6ahb w6ahp w6am w6aoe w6awa w6awp w6bdg w6bf w6bhc w6byb w6bys w6bzd w6bzs w6cas w6cbw w6cib w6cin w6cis w6cnj w6crz w6cuh w6dbd w6dfr w6dj w6dkx w6dpo w6dq w6dqj w6drb w6dsg w6eem w6egr w6elc w6fs w6ft w6hc w6lo w6wb w7ae w7afo w7agb w7agn w7ek w7fe w7kl w7kt w7re w8aac w8ac w8adq w8ahc w8ahs w8alu w8aup w8asc w8baz w8bev w8bda w8bgw w8bjh w8boy w8bpd w8brl w8bsr w8cau w8cfl w8cgo w8cjo w8cmb w8cnu w8cnz w8cp w8epr w8etx w8dan w8dep w8dfk w8dkx w8dld w8dmn w8doa w8dpj w8axa w8duw w8dvm w8ib w8iq w8lf w8li w8lt w8ml w8sp w8ve w8vx w8xe w9agu w9aid w9aio w9ak w9alm w9ama w9anz w9arn w9axu w9ayo w9baz w9bca w9bf w9ajp w9bhz w9bjl w9bju w9bpd w9bpq w9bqe w9bre w9brx w9bsh w9ces w9ceg w9cgj w9cia w9emo w9cov w9cph w9crd w9cub w9cvm w9cvn w9cxx w9dbm w9dev w9dih w9dbm w9dev w9dkg w9dma w9dpv w9dw w9dyl w9dws w9dz w9efe w9efk w9egg w9egu w9ejo w9eme w9eqq w9enm w9eqc w9exw w9fax w9fgv w9fhy w9fid w9fqm w9fs w9fsm w9fte w9fxb w9fxy w9fzs w9gal w9gft w9ggb w9ld w9ll w9ln w9lv w9nk w9qy w9us d4abg eecar37 eecar98 eecar116 ea-jh ea-1bg ea-1cn eb-4jj ef-2se ef-8btr em2eo em2ef em2fs em5ay em5ni em5fl cm5by cm7ex cm7sh g5by g5nn g6yk ct1aa j1ct j5drr k1af k1cm k1ab k1cr k1hr k1pw k3aa k3gr k4aan k6bo k6cjs k6czj k6dbl k6dtg k6dv k6dvg k6dqq k6eha k6ekh k6est nj2pa nn1nic nn7nic oa4o oa4q spcb1 spcm spjs1 ve2ap ve3eb ve4df ve5az ve5co ve5go sn3xj se2ea se2jm sb1ad vk2ac vk2ak vk2dy vk2fm vk2fp vk2hl vk2hj vk2kj vk2ko vk2jh vk2ns vk2rb vk2rz vk3ag vk3ap vk3ar vk3av vk3aw vk3ax vk3bx vk3gt vk3jk vk3jy vk3ls vk4bb vk4bh vk4ra vk5bx vk5hg vk5jh vk5sg vk5wr vk7lj x1g x1f x1j x1ca x1rz z11ax z11fw zlfx zl2ab zl2bg zl2bo zl2xf zl3aj zl3as zl3az zl4ao

Eugene Mattimore, 247 E. 62nd St., New York, N. Y.

w1adc w1agv w1ajb w1ajf w1aks w1ara w1awk w1axx w1bbn w1bd w1bob w1bsn w1caa w1ed w1edg w1egr w1eil w1eq w1ei w1eu w1if w1ip w1jk w1kp w1mk w1pi w1rp w1wv w2abs w2bau w2acd w2aeg w2ago w2ahz w2akm w2alu w2amh w2amq w2amt w2anf w2ans w2aoe w2api w2aps w2asg w2asz w2ate w2auk w2aul w2aur w2av w2avq w2avw w2avy w2ayv w2bda w2bfi w2bic w2bkq w2bkv w2bn w2bnw w2bo w2box wbpa w2bpk w2bpn w2bui w2bwe w2chd w2cin w2cuq w2czr w2da w2ff w2hg w2hn w2hq w2ku w2lx w2np w2nt w2ot w2sg w2vo w2wv w3afj w3afn w3ahc w3amw w3apx w3ard w3as w3att w3aws w3awz w3bq w3bqj w3ck w3ct w3ep w3gf w3kr w3lz w3ma w3mt w3nr w3sn w4agr w4ahh w4aj w4ak w4ar w4ca w4cz w4dw w4ea w4ft w4ne w4we w4zp w5ay w5bg w5ib w5ago w8ail w8alq w8aoi w8awh w8ayh w8bbs w8bei w8bts w8bwn w8cdb w8chb w8cql w8css w8cv w8csm w8ddr w8dqk w8dxi w8gz w8ha w8jm w8kr w8lt w8na w8tk w8wz w9baz w9cbw w9cfj w9emf w9dzz w9eox w9ewe w9fcg w9fp w9mm w9sm ve2qcl

ex-W3ACY, J. Elbert Poist, 24 E. Middle St., Hanover, Pa.

7000- and 14,000-kc. bands

w6dqs w6auk w6ebv w6dca w6ajm w6drb w6bam w6dlx w6euh w6dsg w6dax w6eot w6xbb w6eor w6exk w6etc w6ebj w6doj w6dtg w6bts w6hb w6qy w6chy w6cuc w6ats w6xi w6biw w6eez w6gn w6eyp w6dyo w6bzw w6dsj w6bcs w6avj w6ary w6dzd w6eqf w6dev w6dev w6ebw w6uf w6ql w6bwk w7if w7li w7fh w7afo aa4si ce1ah ce2ab cm2jt cm5fl cm5bi cm5cx ct1by g5by k4kd k4ni kfr5 kfr6 lu3ca lu3dh ne6db nj2pa nn1eab nn1nic nn7nic nmbx oa4s oa4o opta pylaa rx4fn va2la velap velcc velco velay ve1ar ve1dy ve2bd ve4dj vk2lj vk2rx vk2tw vk2aw vk2xr vk3lp vk3ca vk3ep vk3yp vk3pm vk3ct vk4bb vk5bj vk5gj x1j x9a yi1lu ys1fm z1lao z1lax z12ab z14ba xj wfbt

W1KD and W1SF, M. I. T. Dorms, Cambridge, Mass.

14,000-kc. band

z1lao z1lax z12ac z12ag vk7ch vk5hg vk3cp vk4bb vk6sa ce3ah ce3ag ce1ah ct1bx ct1by nu2pa vo8ae f8jf f8ct f8aap f8pam f8eo f8orm g5by g6rb g6vp g5lw on4fp d4yt oh2nm nr2ea nr2ags xw7eff x9a pk1jr vo8rg oa4h k4aag k4akv k4kd k4agf k4ni zs4m k4aan py1ca py2ak py1aa lu4dq oz7g

W2GT, G. B. Angle, 104 Luttgen Place, Linden, N. J.

During April, 1929, 14,000-kc. band

cp1c cx3ah d4aar d4jn ear98 eb4uu ef8aap f8aap f8er f8fgb f8fr f8fra f8ja f8jt f8jv f8jf f8lgb f8orm f8ra f8sx fa8bak fm8gst g2zp g5bj g5by g5lp g5lw g5wk g6cr g6hp g6qm g6rb g6uj g6vp g6xn g6wy g6yv k4ni nj2pa on4ar on4di on4fp on4uu pb7a py1aa py1ib velap velco ve3hb ve3br ve4dj ve8xh vk3cp vo8ae vu2kw w6abg w6ary w6avj w6awq w6drb w6efc w6ju w6ql w6xbb w7acs w7afo w7aja w7li w7ui x9a epa

VE4FV, Don B. Sinclair, 205 Cambridge St., Winnipeg, Man., Canada

January 1st to April 15th, 14,000-kc. band

ce1ah ce2ab ce2ar ce3ag cm2jt ct1bx f8ct f8orm f8wb g2ao g5by g5ml g6hp g6pa g6qb g6vp g6yq kfr5 k4akv k4ni k6alm k6clj k6eha nj-2pa nm-bx nr-2ags py1ah py1at py1aw py1ib py1id py1cm py2aj sa-1xe velap vel4y velco vel4q ve2aa ve2ac ve2ap ve2ax ve2bh ve2ca ve2ce ve3aq ve3bc ve3bk ve3bm ve3bo ve3bp ve3eb ve3cl ve3cs ve3dr ve3dz ve3eo ve3es ve3et ve3hb ve3qs ve3rf ve3rg ve3tm ve4af ve4cm ve4ct ve4cu ve4db ve4di ve4dj ve4dk ve4dp ve4ek ve4ff ve4fn ve4gd ve4gm ve4gq ve4gx ve4hc ve4hh ve4hm ve4hr ve4hx ve4ic ve4io ve4jb ve4jj ve4jz ve5ak ve5al ve5az ve5cf ve5cp ve5cr ve5ex ve5hw vo8rg x9a xpa0ja z1lax z12ac z14ax z14ba wfat

W9BGA, E. J. Raible, 819 Sylvia St., Louisville, Ky.

14,000-kc. band

ap1 ce2ab ce3ac ce3ag ce3bf cm2jt ct1by d4yt f8acj f8btr f8ct f8eo f8er f8fd f8fq f8orm f8pro f8rbv f8sm f8so f8wb g5by g5gx g5ml g5wk g6br g6l1 g6rw g6vp g6vy g6wy g6xb g6xn g6yq k4akv k4ni k4kd lu2ca lu2fi lu3db lu4dq lu9dt nj-2pa nl-gren oa4h on4ar on4fp oza py1aa py1ah py1aw py1bs py1ca py1cl py1cm py1cr py1ib py1id py2aj py2ak py2aw py3ah vk2rx vk3cp vk4bb vk5hg vk5xg x1j x9a z11ao z12ac z12ic z14ba zs4m zt1r

XPAQJA, Cape Finisterre to Cape Verde Islands

14,000-kc. band

w1aao w1adm w1acm w1ahx w1ajd w1alb w1arx w1asu w1bal w1bnp w1bsg w1bsm w1bux w1cmx w1cpt w2aog w2bcq w2bgg w2bhq w2bkv w2bvg w2hr w2jn w2mb w2md w2nr w2rr w2rs w2tp w2uc w3adm w3adp w3ahh w3apo w3bwj w3cee w3jm w3ux w3vg w4aef w4aii w4dv w5bbi w6bcs w6bzs w8bdk w8brh w8cew w8box w8doa w8jq w8mq w9aji w9bmu w9czf w9ecz w9ef w9emb w9eva w9evu w9exb w9fhy w9hm dhqa d4yt ear96 f8acj f8btr f8eo f8pam g5by g5bz g5wk g6cr g6hp g6lk g6nt g6qb g6uj g6ut g6vp k1cm k4ni paodm paofp paowim xpaocp py1ah py1ca py1cm py1cp py1ib py1id py2ig py2ii py3ah sc3bf sp3ar velco ve2ca ve2bg ve3cs zl1fb

(*Continued on page 82*)

Correspondence

The Publishers of QST assume no responsibility for statements made herein by correspondents

QRM on S. F. Transmission

Orange, Calif.

Editor, *QST:*

Your letter pertaining to O.F.S. and Standard Frequency Transmissions received, and the delay in reply is due to the fact that I wished to make a rather lengthy one, which would require some time and thought.

I have reported on the Standard Frequency Transmissions by card once or twice, and have taken advantage of almost all of them since the service was inaugurated because my meters are used as standards by most of the amateurs hereabouts.

My experience during the transmissions of February 8th were such that I was determined to write you about conditions even before I received your letter. Since then, on the 22nd, the conditions were the same, and I feel that something should be done if it is at all possible.

Most deplorable is the act of a greatly increasing number of amateurs of tuning in the signal of W9XL on their receiver and then attempting to attune their transmitters to their receiver *while W9XL's transmissions are still under way on that frequency.* At first I thought of fellow-amateur receivers heterodyning my own, but noticed that the majority of the interfering signals were r.a.e., hence not receivers and *the cat is out of the bag!* Some amateurs are just exactly that thoughtless, if not deliberately inconsiderate.

It was only because I have a very selective receiver that I was able to get the transmissions on the 8th through the interference. At times, however, it was quite difficult, especially when W9XL's signals faded badly.

Amateurs continue to work right through the transmissions regardless of the fact that they may be blanketing them entirely for a large number of receiving stations. On a separate sheet enclosed herewith you will find a report on a number of them; their calls should be published. Of course, there is another bunch of amateur stations who continue to transmit right through the Standard Frequency Transmissions and who apparently feel that they are a law unto themselves. I refer to those who are to be regularly found outside the limits of the bands and who, when you mention that fact to them say, "Oh, no, I can't be. W9XYZ says I am right in the middle of the band." They are just precisely the boys who should be spending their time calibrating receivers and meters!

— J. E. Waters, D.D.S., W6EC, W6XE

[The list of calls referred to is not being published, but we wonder how many amateurs can be positive that their call is not included and how many can be sure that theirs is! — EDITOR.]

Atlanta, Ga.

Editor, *QST:*

For the past three months we have been trying to get the standard frequency transmissions from W9XL, but so far have been unable to obtain enough readings to make a complete curve for any one band for our frequency meters. The whole trouble is that the majority of amateurs care nothing for these transmissions and do not show the courtesy to their fellow hams of standing by during these transmissions. Consequently, the QRM is so bad that even if you hear W9XL he comes through under such a maze of stations that the accuracy of our receiver settings is doubtful.

It is noted that you strongly recommend the use of these standard frequency transmissions, but how can a fellow use them when he can't hear them? Is there not some way that you can persuade these careless amateurs to be decent enough to stay off the air for the short time required for these schedules and let the fellows who wish to keep a good station and abide by the laws use them?

Last night's attempt at getting these transmissions was so disgusting that we decided to get the matter off our chest by writing you, hoping that you could do something to help us out.

— J. W. Spratlin, W4KV
—M. S. Alexander, W4VL

877 Palisade Ave.,
Teaneck, N. J.

Editor, *QST:*

On the night of March 22nd, I was trying to calibrate some coils from W9XL's standard frequency signals. Due to QRM, I actually got but two readings in the 7000-kc. band.

This morning I copied between 7 and 10 stations, all 1's and 2's, on frequencies between 8100 and 7300 kc. with as many styles of notes. No one knows the variety of gadgets used as modulators.

Conclusion: A very general disregard of standard frequency signals, their use and relative importance; also, a very bland indifference to official frequency regulations.

Antidote: Some pertinent comment on the subject in future *QST* paragraphs.

— J. A. Woods

"Here at last is The Book that we of the Radio profession have needed for a long time. It is the best and most complete handbook ever published" says J. H. Bloomenthal, Chief Radio Operator, U. S. S. B. Steamship "East Side".

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Edited by ROBERT S. KRUSE, for five years Technical Editor of QST.

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Name.....
QST 6-29

St. and Number.....

City and State.....

[Letters of the above type are being received in increasing numbers, and are indicative of an unhealthy condition. While it is quite probable that a good deal of the interference with the standard frequency transmissions is unintentional, deliberately tuning a transmitter to a standard frequency *during transmission* is inexcusable and smacks of malicious interference.
— EDITOR.]

QSL And CQ DX

807 W. Page St.,
Dallas, Tex.

Editor, *QST:*

Here is the way I summarize the QSL problem:

Let those who desire a QSL card or confirmation QSL first, thereby making their wants known. Let every station receiving QSL cards be courteous enough to reply, remembering that there have been times, and there may be again, when they also will appreciate a QSL.

This is a policy that has been in use here for about three years and has proven satisfactory, although even this much QSL-ing would cut the operating time at some of the more prominent stations. However, it seems to be the best substitute for a perfect policy.

I would also like to say a few words concerning another fault, the usual method of calling "CQ DX." Why does a station call "CQ DX" for 30 seconds before signing? How can you tell whether you are his DX or not before you hear his call? I have wasted many a minute listening to "CQ DX" calls thinking I had a foreign station only to discover some time later that he was in the next district. Of course long calls are at no time in accord with A.R.R.L. policy — but we still have them. Let us at least have the "CQ DX" call broken more often by the station call so we can determine whether or not we would be of interest to the station calling.

— *Edw. A. Block, W5AFB*

Dividing the Bands

1324 49th St.,
Brooklyn, N. Y.

Editor, *QST:*

As a whole, conditions are better now than they have been in former years. All this talk about being unable to work through the QRM is, after all, just "talk"! The way things sound now, everybody seems to be working somebody else without the least bit of complaint on QRM. Copying is much easier with the new type receiver — so much so that we can consider 1929 with its operating conditions a vast improvement over the 37.5 days.

Our greatest problem, of course, is working through U.S.A. signals to get at the weak foreigners. It simply isn't being done with any degree of success. Early evening QSOs with Europe have been inconsistent and incomplete. It is at that time of the day when DX seems least possible.

But even this has its solution. W2CRB suggested that a certain small band, say from 7160 kc. to 7075 kc. and another slice in the 4000-kc. band be set aside for foreign use only. In this way, DX will have a clear channel for U. S. communications.

However, it seems as if conditions are changing naturally. Today, we find our 7000-kc. band divided into the familiar lower and upper edges. Stations on 7300 kc. find it unnatural to work stations on 7000 kc. This is probably due to the fact that our dial readings have been spread out and it takes quite a time to tune from 7300 kc. to 7000 kc. It would require calls of at least five minutes for stations on one end to work stations on the other — and then there is that degree of uncertainty of having somebody else, on a higher frequency call the same station.

There may come a time when the middle of our bands will be almost deserted. High powered stations will find it hard to work DX because DX stations will naturally go to the center of the bands to work U.S.A. (where they will have the most success) and thus cause QRM to U.S. signals in their own country. Foreigners may also shun the edges of the bands because they will find it hard to work U.S.A. through the U.S. QRM. It will be a natural division between the United States and the foreign countries.

One thing, though: Everybody will simply have to get that d.c. note, if we are to have ideal operating conditions.

— *Nat Pomeranz, W2APD-2HY*

New Ham Comment

Browns Valley, Minn.

Editor, *QST:*

I am a beginner and am using a transmitter that I built according to 1929 principles. On 3500 kc. with the rig tuned according to the Handbook, I have been getting xtal control and d.c. reports.

A UX-210 is used on the oscillator in a self-excited outfit with a UX-281 full wave rectifier and a brute force filter of 30 henrys and 4 mikes. A monitor is in operation continuously both as a frequency meter and signal checker.

I would like to add that I have met a very nice bunch of hams on the air, all willing to QRS for me, and I surely appreciate it.

— *Charles Scheifley, W9AMK*

The Real Spirit

Georgetown, S. C.

Editor, *QST:*

My detail as Field Artillery Instructor of the South Carolina National Guard is rapidly drawing to a close, and necessarily, a certain part of my activities with amateur radio, as I will not after September 1st, have the time to devote to this very interesting and most fascinating work that I have done during the past four years. However, I am an amateur at heart and will always remain so.

I will never miss an opportunity to be of any

help to our amateur association wherever the chance presents itself.

Words cannot express the pleasure and benefit I have derived from laboring over page after page and copy after copy of *QST*. Your personnel there has done some marvelous work and most certainly deserve the warm praise of every well-meaning amateur in this country and the world at large.

To my idea, the narrowed bands have been a blessing in disguise to the amateur. He must now become a real amateur to meet present conditions and for that he is progressing and not stagnating.

Some of the amateurs are yet slow to grasp the idea but in time I am sure it will come to them as all good things do, by hard work and perseverance.

Let's strengthen our hold on what we now have by striving to get as many of the gang to become affiliated with the Army and Navy wherever conditions are such that we can.

On September 1st, I go back to duty with troops and will take over a battery of Field Artillery, at Fort Bragg, N. C. I intend to still hold on to W4EI and put my station in operation there but necessarily my duties will leave me little time for amateur radio.

— *Charles W. Glover, W4EI*

Station Description Contest

R. F. D. 9, Box 69,
Findley, Ohio

Editor, *QST:*

Here's to the Station Description Contest. I hope a good deal of interest is taken in this competition as we all like to see what the other fellow's station looks like and get his idea of what's what. I have referred to this department of *QST* a number of times myself when making or contemplating changes.

— *Ross Moorhead, WSARO*

A Blessing Disguised

3rd Ave. W., Box 164,
Hanna, Alberta, Can.

Editor, *QST:*

I take this opportunity of expressing my sincere thanks and great appreciation of the truly beneficial work of your technical staff on behalf of the amateurs. The work of these men dispelled the fears entertained by many that the reduced bands would put the ham practically out of existence. The improvement in transmitters has actually widened the band and had the narrow bands been in effect earlier, it is safe to say amateur transmitting would be more efficient than it is even now.

The time is opportune for the A.R.R.L. to take drastic steps to clear the i.c.w., Ford coil, etc. transmitters to the bands where their operation is permitted. There are too many of them on the 7000-kc. band and in view of the circuits developed, to meet the pocketbook of the low power man, there is no excuse for the operation of any-

thing but what the law stipulates, i.e., pure c.w. on 7000 kc.

Thanking you for the invaluable aid your articles have given me in the past, and wishing the League every success.

— *W. P. Roberts, VE4GM*

I. A. R. U. News

(Continued from Page 67)

7000 kc. in order to miss the heavy QRM on that band, there are now many long-distance stations using this frequency. Towards the end of the month, South American stations were heard almost every night, from 2100 G.M.T., while earlier in the evening VK, ZS, VQ and AI stations were received.

Very few W stations were heard on this band during the month. A number of ZL and VK stations were heard and several of our low-power stations made first contacts with their antipodes. The 7000-kc. band is being neglected by most of the British low-power stations, who find it impossible to work successfully through the fierce QRM set up by badly modulated phone and raw a.c. stations on the Continent. Many Britishers are refusing to work these stations, and they suggest that all amateurs who have now good notes should refrain from making contacts with them.

It has been noticed that a large number of Russian stations had commenced work on this band. Quite a few seem to have forgotten that a convention was held in Washington recently with the object of stabilizing amateur conditions, as no attention seems to have been paid to the official wave bands or call signs.

At the time of writing, the British 28,000 kc. tests are running. No important contacts are yet reported, but further information will be included in these notes next month.

We should like to draw the attention of our friends who read these notes to the fact that in future the R.S.G.B. will not forward QSL cards to British amateurs who are not members of the Society. Cards for such persons, if delivered to our QSL section, will be returned to the sender. The present membership of R.S.G.B. is 1600, and new members are welcome from all countries. The subscription is 12/6d per annum ($3.00) and the Headquarters is at 53 Victoria Street, London, S.W. 1.

ITALY

By Ing. E. Montu, Secretary General, A.R.I.

There is very little to report from Italy at the present time. Amateur transmission is held up here for the present owing to the fact that the Italian Government has not yet issued any licensing regulations. This compels us to continue working under cover, and considerably hampers amateur operation.

We hope to secure favorable amateur regulations in the near future, however.

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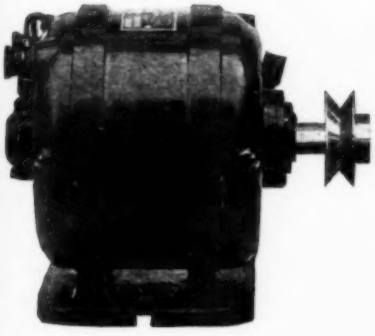

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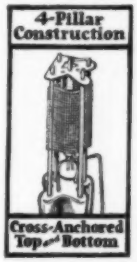

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NEW ZEALAND

By J. R. Tabley, ZL3CT

All New Zealand hams are allowed the frequencies 1725–2000 kc., and 3500–4000 kc. After operating on these bands (the first one is not used much) they are given permission to operate on 7000–7300 kc. The idea is to have them gain proficiency in operating their transmitters on 3500 kc., and doing away with inexperienced "lids" on the valuable 7000-kc. band. The 14,000-kc. and 28 mc. bands are not assigned except by special permission, and to get such permission one has to do something extraordinary, viz., work all continents. This is a rotten idea and a big kick will soon be made about it. Raw a.c. and poorly rectified a.c. are supposed to be taboo, but are not in practice. Message handling is strictly forbidden. The maximum power allowed is 100 watts into the aerial. The average input is 20–40 watts, although some go as high as 300 watts.

An annual license fee of £2/2/ ($9.00) is required.

There are only one or two crystal control stations here so far, but some 3rd district hams are thinking about it. With the new 7000-kc. band, QSO with Australia is easy, but it is harder to work W and other DX than it was on 10,000 kilocycles. There are several stations experimenting on 28 mc.; they are ZL3AR, ZL2AC, ZL1AN, ZL1FT and a few others. Quite a number would go down there if it were allowed.

The N.Z.A.R.T. will probably have branches in the 2nd, 3rd and 4th districts very shortly. The best time to work New Zealand seems to be from 0700 to 1230 G.M.T., which is from about 6:30 p.m. to midnight, New Zealand time.

DUTCH EAST INDIES

From Mr. A. Krygsman, at Palembang, Sumatra, we learn that there are now about fifty active amateur transmitters on the air in the Dutch East Indies, and that interest in amateur work is very high. The average station seems to use but low powers — 10 to 20 watts, with a few more around 50 watts and one or two as high as 500 watts.

DX is not as much as might be hoped for as yet, but many tests have been carried out with Australian amateurs in duplex telephony, and good results secured.

The Government seems to be favorable toward the amateur, and a special commission is now engaged in studying amateur subjects. It is hoped that a set of regulations in accord with the Washington Conference conditions will be issued before June.

Mr. Krygsman states that the amateurs of the D.E.I. are now thinking of forming an amateur society for their territory, with the name Nederlandsch Indische Vereeniging Voor International Radioamateurisme, or the N.I.V.I.R.A.

This is splendid; we wish the D.E.I. hams much success in their endeavor, and will be glad to watch the progress of the new organization.

WHDC

(*Continued from page 16*)

back to Los Angeles. Wherever feasible the expedition will sail up all navigable rivers into the interior as far as possible, pursuing still farther along little known and unexplored rivers by means of Johnson outboard motor-equipped shore boats. In all cases the unusual will be sought rather than the conventional tourist data.

If you hear WHDC don't think it another commercial but give us a "shout."

The New England Division Convention

(*Continued from page 43*)

emergency. Ensign John L. Ingram, U. S. Naval Reserve, spoke on the Naval Reserve Net Work and what pleasure may be had in enrolling and participating in the work of the Naval Reserve units.

The entertainment feature of the convention was of the best, especially the monologue "The Radio Widow" by Miss Elizabeth Bradshaw, Treasurer of the Radio Club of Rhode Island, who is also an active "Ham." The Eastern Mass. Amateur Radio Ass'n gave a fine musical number with Cooley at the piano. The Providence Radio Ass'n had a session of "Federal Radio Commission in Action." A fine example of Rube Goldberg's imaginative inventions was given by a member of the Radio Club of Rhode Island. (Sorry, om, we lost your name.)

The ball room was filled to capacity when the banquet was announced and after a good dinner, Director Best sprung the surprise of the evening by introducing Mr. Hiram Percy Maxim, our President, who in his inimitable way gave us some sound advice. A very good delegation from the Hudson Division were in attendance and we all appreciate their fine spirit of coöperation.

Most conventions have to come to an end and this one finished with flying colors by the awarding of numerous prizes (too numerous to enumerate) contributed by manufacturers interested in the activities of the radio amateurs. Fellows don't forget to acknowledge your prize.

Au revoir until we meet in Worcester in 1930.

— *A. A. H.*

Calls Heard

(*Continued from page 69*)

Cape Verde Islands to Santos, Brazil

14,000-kc. band

w1aep w1ahx w1aqd w1aub w1avf w1axv w1bkr w1bug w1cek w1ctt w1ka w1zz w2adp w2aiz w2ajb w2aql w2bkr w2bvg w2ch w2cuz w2evf w2fp w2xaw w3afh w3jm w3jn w3vg w4aef w4aii w4dv w4to w5aye w5bbi w6bax w6cis w6dgq w6drb w6dzd w6ehf w6hb w6ql w8avs w8axa w8bpa w8brh w8clq w8za w9agu w9anq w9axf w9beu w9bgg w9bht w9bpm w9cbh w9czf w9def w9dex w9eaj w9ak w9frq w9lb ce1as ce1l ce2ab ce3ab ce3ac ce3ag ce3bf d4qa ear96 f8aap f8acj f8btr f8fd f8gdb f8ho f8rbv f8rko f8am f8xz g5by g5lw g5qv g5wk g6bd g6ci g6el g6er g6dr g6co g6uj g6vp g6xj on4fp on4ro py1aa py1cm py1cl py1ib py1ah py1bs py2ag py2aj py2ak py2bc py2ih py2ii py2qa

lu2fi lu3dh lu4dq lu9dt lu1na lu1cv ve2be ve2bg zs4m zs5u zu6n

S. S. Ulua, Port Limon, C. R. Luther W. Eldridge, Ppr.

April 12th, 7000-kc. band

w1aed w1bbl w1bgq w1cdg w1yb w2bjj w2blo w2hc w2mq w2ot w2rp w2wr w3ahz w3kr w3pf w4ac w4aef w4afu w4agr w4hm w4ox w4va w5ach w5bcx w5ox w8agq w8ayh w8cau w8chi w8ciw w8cmg w8css w8mb w8tk w9bjl w9ekr w9eqc w9fp w9ggb w9um

G6PP, M. W. Pilpel, 54 Purley Ave., London, N. W. 2, England

7000- and 14,000-kc. bands

w1agw w1axx w1bal w1bdi w1bea w1bvl w1ek w1ex w1ga w1hg w1if w1lja w1kh w1lx w1qz w1wv w2ace w2adp w2afo w2age w2alo w2atk w2aur w2baq w2bda w2bdj w2bfi w2bie w2bir w2bjr w2boz w2bui w2et w2cy w2kj w2ov w2rv w2rz w2uw w2vd w3afx w3ajh w3ard w3avf w3bg w3bnu w3bph w3cfg w3ckl w3kr w3lz w3zzc w4abw w4aef w4aen w4aeq w4afw w4akq w4bk w4ib w4pk w8aa w8adg w8ads w8agi w8ank w8auz w8axz w8bbs w8bcu w8bxh w8cai w8cnt w8cpe w8dme w8dqk w8drs w8duw w8fl w8fz w8hx w8jw w8rr w8sf w8sp w8uk w9bdg w9crj w9cvn w9dlm w9eey w9ek w9ema w9fs w9jl w9px kfr6 ve1ap ve2al ve2bb ve2be ve3et nr2ags py1ib py2bc cm2jt

W7ACB, K. M. Casey, 726 No. 47th St., Seattle, Washington

14,000-kc. band

w1acf w1aep w1aff w1agi w1alb w1anz w1apq w1are w1bsm w1cfi w1cmx w1da w1kd w1kn w1mr w1we w1xl w2ag w2alz w2arb w2boa w2bpg w2dl w2fp w2sv w2wa w2ws w3ahh w3age w3apx w3aql w3hh w3mj w3ut w4abw w4aef w4ama w4aq w4oa w4ly w4uv w5acb w5ahx w5ajk w5aqe w5awd w5ayu w5ayy w5bcq w5bh w5cq w5ju w5rg w5tp w5tu w5yg w5za w6afc w6ags w6aob w6apw w6aqj w6arx w6ary w6asl w6awp w6azk w6bbo w6bjf w6bqk w6bto w6bxv w6che w6clz w6cub w6cvj w6czm w6dib w6dcv w6ddy w6dfs w6dhs w6dij w6dln w6dmk w6dpf w6dpj w6dtu w6dwp w6dxm w6dyj w6dzl w6ebv w6ec w6eem w6eez w6efc w6egv w6ejc w6eop w6eot w6eps w6erc w6erm w6etj w6eug w6hb w6hm w6kg w6ql w6qy w6rv w6wb w6wn w7aav w7abg w7afo w7ga w7vk w8aae w8ab w8aeb w8alh w8alu w8aup w8avp w8bpz w8bta w8buh w8bwu w8cbd w8ccw w8ced w8cra w8dhc w8doa w8dps w8duw w8dxm w8dyk w8iq w8tb w9acm w9adb w9aeq w9afl w9afn w9aid w9aja w9ama w9anz w9aok w9atq w9auh w9bay w9bga w9blt w9bmx w9bnd w9bpm w9bqe w9bqf w9bvh w9caa w9cbh w9ce w9cok w9crr w9csu w9cuh w9cyo w9dar w9ddv w9dku w9dly w9doq w9dqj w9drv w9dth w9dwo w9dwz w9dxy w9eaj w9eca w9edd w9ehi w9eho w9ef w9ejo w9end w9enf w9env w9esn w9eso w9eta w9exa w9exw w9fac w9fbw w9ffd w9flh w9fof w9fug w9fvd w9fvw w9fxj w9fiw w9gbq w9gdv w9gsj w9gfz w9ggw w9ghx w9gic w9lf w9lt w9mt w9ph w9wo w9wp ve2al ve2as ve2ax ve2ca ve2cg ve3bm ve3cs ve3dr ve3hb ve4ey ve4fi ve4gu ve4gq ve4hc ve4hl ve4hw ve4jb ve4jg ve5aw xw7eff zl1am zl1ao zl1ax zl1fh zl1fu zl2aw zl2ba zl2bi zl4ao rx1aa f8awq f8axq f8fd f8orm f8rko f8ypz xf8hpg ce1ah ce1ai ce2ab ce2ac ce3ac ce3ag ce3bm ce3bf kfr5 ok1ab k1cm k4akv k4ni k6acr k6acw k6alm k6clj k6dpg k6dtg k6eha k7anq k7mn xpg xwl x1j x9a x9b j1tx j1zb jd1 on4ar on4ft on4uu vk2ek vk2hu vk2kl vk2ku vk2lj vk2ns vk2ro vk2rx vk3bd vk3ep vk3cx vk3he vk3ot vk3pa vk3pm vk3rj vk3rx vk4bb vk5bw vk5hg vk7eh d4uj nkf g5bj g5bz g5mq g6ge g6wy g6xc oh2nap oh2nm wfat oa4h ca4o oa4s ddeg sp3ar vs3ab

WSQ, E. P. Kampf, U. S. C. and G. S. S. Lydonia, General Delivery, Jacksonville, Fla.

vk2ac vk2wj vk2gq vk2ns vk2hl vk2ek vk2hm vk2jb vk3rj vk3jk vk3pa vk4ra vk5jh vk5jo vk5bj vk5xg vk6mu zl1ft zl1fw zl1zx zl1rx zl1fk zl1bj zl2go zl2aw k1hr k1cm k1af kdv5 k6eno k6eqm k6tb k6ch k6cjs k6dv k6dws f1lab xbx wfbt ct1as w6dqv w6edy w6ab w6ebr w6drb w6cja w6cbw w6epz w6by w6awy w7gk w7rr

W8AVS, D. T. Byram, 43 River St., Homer, N. Y.

14,000-kc. band

lu6fc lu3dh lu2bx f8aap f8eo f8btr on4di on4ft g6vp g6bd g6yq g5bj g5bz paofp paodm ok1rv ce2ab ce3bf py2qa py1aa k4akv ap1

7000-kc. band

ct1aa ct1bx ct1bv ct1cn ct1bd ct1by ear62 ear122 ear98 ear69 earo ear47 ear116 f8hm f8btr f8axq f8oqp on4dj on4fp on4di on4bn on4fm vk2rf vk3ls vk2rb zl2ac d4dkf k6nl k6avl k6alm k4aan cm5ni cm5fl cm7sh cm5ay ne8arw nj2pa c7z xpaoja

W300, Harold O. Bishop, Front and Edwin Sts., Harrisburg, Penn.

ve3ey w1aby w1aqa w1ayo w1aoz w1aim w1aii w1abo w1bgq w1cki w2aow w2azb w2azu w2ahl w2ahz w2ahg w2aca w2aoj w2aed w2ao w2bee w2bs w2bsc w2bzp w2bma w2bey w2de w2gj w2st w2tl w2ga w2js w3abx w3asw w3aeq w3ckj w3cah w3adg w3bfz w3mb w3mp w3ap w4aev w4agr w4we w4oa w4pk w5aov w5axl w8ahg w8ajh w8ahz w8adf w8aos w8akh w8bgp w8bxy w8ecz w8cjx w8dce w8dxb w9cj w9dpg w9esl w9eas w9bag w9fma w9ewx w9evu w9gew w9fzl w9fvo w9eyv w9ghi

SU2BC, A. Canepa Clerici, Calle Agraciada 2310, Montevideo, R. O. del U.

w1kh w1pm w1zz w2brg w2mb w2rs w4aef w6adg w6bcx w6eub w6drb w6euh w6ehu w6ehf w6gnr w6uf w7ajj w8axa w9aji w9bca w9eok w9def w9evu w9ef oa4h oa4s oa4l xw7eff

W8CHP, Joe Krautz, Malden, W. Virginia

ct1aa ce3ac w3ke f8aa f8eo f8mrh haf3an k6alm k7go k7gm lu8ad lu4dq nd7ba nj2pa nj2pm paofp paogw pyl1d se1av ve1ap ve1ah ve1go ve1jb vo8rj xpaoja zs4o fr5

ZL2GO, Harold G. Fownes, Box 512, Wellington, New Zealand

w1abd w1afl w1afb w1bld w1hj w1ahr w1age w1ajx w1akd w1alg w1ayo w1aaw w1cz w1ht w1cra w1chc w1apk w1bbt w1aze w1ky w1ars w1bkm w1blf w2bih w2aos w2aec w2at w2bal w2cjx w2anv w2axx w2bpv w2blq w2agr w2aal w2aiz w2ajl w2bia w2bxr w2chk w3acq w3auo w3awb w3anq w3atb w3arn w3alq w3ais w3aoc w3abf w3arr w3kj w3bbw w3bwt w3ahp w3apx w4aiy w4ahr w4aaq w4aah w4aii w4ne w4ace w4tk w4vc w4ajr w4aam

W3FJ, Ted P. Mathewson, 24 N. Boulevard, Richmond, Va.

w6eot w6adp w6by w6ebn w6bwi w6ab w6eiy w6dbd w6emg w6dfw w6eds w6baj w6dpf w6dyn w6dwp w6bto w6bcs w6fc w6dtu w6efe w6dhq w6wb w6kj w6bam w6fk w7akv w7lp w7hx w7fl w7le w7ahx w7pv kdv5 kfr5 k4ni nj2pa f8aap f8agb f8axq f8jf f8ct f8erd f8lgb f8acj f8xd f8fd on4di on4fp on4ft g5by g6xb g6vp earl ear65 ct1aa 55x se1ah se3bf su2bc py1aa ok1fm vk3cp vk3pa vk3pm vk3lp vk3ml vk5hg

G6YL, Miss B. Dunn, Felton, Northumberland, England

w1awf w1aed w1emp w1epi w1xw w2ahi w2apy w2avb w2bda w2ev w2evj w2eyx w2eir w2ov w2rs w3ar w3pf w4aef w4rb w8afm w8axa w8bu w8dfy w8kv xw2px xw7eff frear75 freara frearb ev5af py1cm yi1lm yi2gm yl2ad yslaa ryle vu2kw ap9frg au7aa au7ab au7ao au7ae au7au au7ba au7kab au7kad au7kag au7kwd ve1br ve2ea nx1xl nn1nie em3af 1xr 8fs3 cxah gxed kgfe rex rwx sdn sdpa sgkn

BRS-186, G. Russell Lee, Opr., 25 Boundary Road, West Kirby, Cheshire, England

w1aep w1aqt w1alb w1bux w1caw w1cek w1cjc w2ahi w2bci w2bhq w2arb w2fl w2hq w2ku w2md w4cq w4aef w3jm w9fdj w9ef w8axa ve1ar ce2ac vk3ot k1cm ap9frg cv5af au7kaw zs4m su8an su8rs ce2ab cn8mb yi1lm ok2yd fi1e xw7eff py1cm w2arb w2fl py1aw

W6QL, J. R. Wells, Box 96, Patton, Calif.

ac8ag ac8rv ce1ah ce1ai ce2ab ce3ac ce3ag f8fd g6yq jlad j1et j3cg j3dd j4zz j9fs k1af k1cm k1pw k4ni k7aer lu2lu lu2ca lu2fi lu3dh lu4dq lu6fe lu9dt oa4h oa4o py1cm py2aj rx1aa vk2ek vk2lj vk2rx vk3bd vk3cp vk3cx vk3lp vk3pm vk4bb vk5hg vk7ch vs1ab vs6ab z11ax zl2ac zl2be zl4ac zl4ba zs5c

VK2RX, H. C. St. John, 82 Gibbes St., Rockdale, N. S. W.

w1ry w2bdr w2bvg w3sh w4wa w5rg w5ahx w6gm w6dwi w6bam w6chy w7mx w8of w8cew w9ef w9che wi5vx ar8ufm ce1ah ce2ab ce3ag d4uj eb4ft f8axq f8btr f8ct f8gy f8rcm f8xu f8xz g2xv g5by g5bz g5wk g5yx g6hp g6qb k6eha oh2nm ok2yd oh2nm paorz su1cv su8an ve1br sc3bf ve2be ve2bg vs3ab xw7eff yi1ac

OKRP19, Alois Weirauck, Městec Králové, Czechoslovakia

w1amt w1aof w1bal w1efi w1ekp w1emp w1mv w1mk w1pl w1sz w1yb w2aeh w2bcm w2biv w2ckj w2cuq w2evj w2ey w2exl w2hn w2kj w2ov w3aws w3hg w3pf w3sz w3tr w4ft w4gk w4tz w8adm w8duw xw7eff k1cm k4aan kfr5 ag7ab au7aa au7ao au7ba au7kad au7kag au7kwd fm8gkc fm8rit fmtun2 fmear88 yi1lm vk2ns

W8DYI, D. H. Harris, 715 Deer St., Dunkirk, N. Y.

f8acj f8akj f8axq f8cgb f8cp f8dot f8eo f8er f8fc f8fd f8fo f8he f8jt f8cx f8orm f8pm f8pro f8rh f8sm g2xu g5bj g5by g5bz g5yg g6gc g6qb g6vp g6wy g6xn g6yq gi6wg ear65 ear96 ear116 oa4h oh6ang ct1aa ct1bx ct1by paogw paofp paodm on4bt on4nk on4pf ce3ac ce1ah xpaoja lu2ca lu2ul lu4dq lu6fe lu9dt py1aa py1bl py1cm py1id py1qa su1cv su8rs vo8ae vo8rg xf8wb d4abj vk3cp ys1aa sc3bf em2jt em5fl kfr5 k4ni k6alm tgb xij x9a nmbx xj w6ac w6ag w6adp w6asl w6atf w6arg w6ary w6awj w6awp w6ax w6ayo w6bam w6bh w6bfi w6bto w6bes w6bnx w6box w6bsp w6bys w6cjv w6cez w6dev w6dhq w6dls w6dks w6dev w6dml w6dpj w6dgb w6dns w6dj w6dpy w6dtj w6drb w6dtu w6dzm w6ecr w6efc w6eot w6dwi w6dij w6eot w6erm w6eug w6fk w6jn w6kg w6nh w6pu w6sk w6uf w6vz w6wn w7abg w7agb w7afo w7aja w7aby w7akv w7ah w7ac w7ais w7aj w7aij w7ek w7le w7fh w7hx w7if w7js w7kq w7mw w7ov w7pv w7si w7ui w7si w7un

W. R. Jardine, 264 Buckley St., Essendon, W5, Victoria, Australia

14,000 and 7000kc. band

w1awe w1bux w1cmx w1cvy w1fs w1ry w1byl w2avb w2mb w2md w3avl w4aef w4sh w4zze w5atf w5aot w5bbe w5jc w5kl w5mx w5th w5ux w6abk w6amw w6aqq w6ax w6bpy w6chy w6cih w6cmv w6cuh w6dkx w6dsg w6drr w6dtd w6dyj d6bdn w6eeg w6eer w6eme w6eof w6fk w6ty w6ui w6dwy w7iz w8dpa w9aok w9cmv w9dws w9epa w9ert w9xi k6alm k6eha k6ene k6eck k1cm k1hr k1pw k1gz k1re k3aa pk4az g5by g5bz se1ah ac8zw vs3gg nz2

28,000-kc. band

vk3bq vk3de vk3hc vk3ml vk3pm

W1BUX, D. H. Borden, Touissel, Massachusetts

ar8ufm ce1ah ce1ai ce2ab ce3ac ce3ag ce3bf ct1aa ct1bv ct1bx ct1by ct1cf ct2ab d4abn d4jl d4lg d4uo d4yt earl6 ear69 ear96 ei7c ei8h f8aap f8acj f8axq f8bf f8btr f8ct f8ep f8eo f8er f8faf f8fd f8fk f8fr f8gdb f8gv f8ho f8hz f8ih f8ix f8jf f8jt f8kf f8kv f8lgb f8olu f8orm f8pam f8pns f8pro f8rbv f8rko f8rrr f8sm f8saf f8tan f8wb f8xz g2qv g5bj g5by g5bz g5cy g5fv g5ls g5lw g5ml g5mq g5qf g5qv g5us g5uw g5vl g5wk g5wp g5yx g6bd g6br g6eh g6cl g6cr g6gs g6gz g6hp g6lk g6ll g6nx g6oh g6pa g6qb g6rw g6ta g6uh g6uj g6ut g6uw g6vj g6vp g6wd g6wi g6wl g6wo g6wt g6wy g6xb g6xn g6xo g6xp g6yq gbvj gi5wd gi6wg gren lu2i lu3dh lu4dq lu6fe lu9dt 4kakv k4kd k4ni k4sa kt6alm k7ady oa6q on4ar on4di on4fp on4fq on4ft on4jj on4ka on4re on4uo xoz7xu nd7ba nj2pa paodw paowim paowr paosf xpaoja pk1jr py1aa py1aw py1bs py1ca py1cm py1cn py1cr prlib py1id py2aj py2ak py2bc py2ig py2ih py2ii py2qa py3ah rx1aa sp3ar su8an ti2ags ti2ea vk2aw vk2rx vk2tw vk3bq vk3ca vk3cx vk3cp vk3jk vk3jo vk3my vk3rx vk4bb vk5hg vk7ch vo8ae vo8an vq2bh vq2bk x1j x9a zl1ao zl1az zl1fb zl1fh zl2ac zl2ae zl2aw zl2go zl3cg zl4ba zs1a zs1a zs4m zs5d zs5n zs5q zs5s zs5t zs5u zs5w zs6z zs6p zt1j zt1r zt2b zt5r zu6a zu6c zu6e rwx xw7eff

Charles Wilkinson, 79 Gould St., Wakefield, Mass.

w5aa w5ace w5aew w5afg w5ahx w5ain w5alg w5aly w5amr w5aot w5aqe w5aqx w5ara w5atw w5avx w5awd w5ayy w5ayz w5azr w5baj w5bay w5bbc w5bby w5bem w5bdd w5bdx w5bh w5bj w5fc w5hy w5jd w5kh w5lo w5mx w5pa w5qj w5qq w5qz w5rd w5rg w5tw w5ux w5ya w6ary w5zd w6bam w6bcr w6btj w6bto w6bzw w6cui w6ddg w6dgz w6die w6drb w6dri w6dtl w6dtz w6dwi w6dyo w6ea w6eem w6ef w6efc w6ek w6hc w6io w6vz w6wn w7aeq w7adi w7afo w7aii w7aja w7alk w7mw w7ub w7ui w7vi k4ni cm1l cm5ac cm7sh ct1aa ct1by ct3ab cx3ah ear65 ear96 ear116 ef8aap f2nm f8axq f8bl f8cp c8ct f8jd f8mst f8oa f8orm f8pro f8zh g5aq g5bz g6vp g6wy g6xt lu3dh nj2pa on4ar on4co on4fp on4ft on4jj paogw paowem py1bs su8an ve4db ve4dj ve4fu vo8ae zf7yp